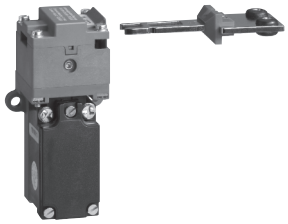
KEYED INTERLOCK SWITCHES



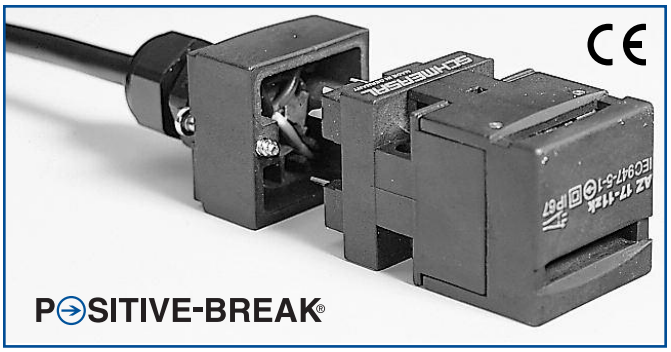



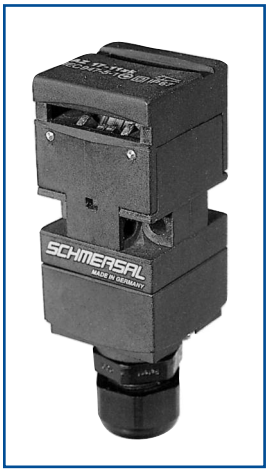
SELECTION GUIDE

Switch Series	Housing Material	Envelope Dimensions	Contact Configurations	Catalog Page
AZ17 AZ17zi	Glass-fiber, reinforced thermoplastic	1¼" × 1¼" × 2½"	1 NO & 1 NC 2 NC	4 8
AZ15/16 AZ16zi	Glass-fiber, reinforced thermoplastic	1¼" × 2" × 3"	1 NC 1 NO & 1 NC 2 NC 1 NO & 2 NC 3 NC	12 18
AZ200	Glass-fiber, reinforced thermoplastic	1½" × 8¾" × 1½"	2 PNP Safety Outputs 1 Diagnostic Output	22
TZG	Glass-fiber, reinforced thermoplastic	1¾" × 2" × 3¾"	1 NO & 1 NC 2 NC	24
SDG	Die-cast aluminum	1¾" × 2" × 6"	1 NO & 2 NC 2 NO & 1 NC 3 NC	28
AZ3350	Die-cast aluminum	1½" × 1¾" × 4½"	1 NO & 1 NC 2 NC 1 NO & 2 NC 3 NC	32
SHGV (Key Transfer)	Die-cast aluminum	1¾" × 1¾" × 4"	1 NO & 1 NC	36
AZ415	Die-cast aluminum	1¾" × 3½" × 4"	2 NO & 2 NC	38

SERIES AZ17

Compact Tamper-Resistant Movable Machine Guard Safety Interlock Switch





Description

The compact Series AZ17 is designed for use with movable machine guards/access gates which must be closed for operator safety. Their positive-opening NC contacts provide a significantly higher level of safety than conventional spring-driven switches whose contacts can weld or stick shut. And their tamper-resistant design prevents bypassing with simple tools, bent wires or other readily available means. Their IP67 rating makes them ideal for interlocking safety guards in hostile environments.

Operation

The AZ17 electromechanical safety interlock switch consists of a rugged switch mechanism and a geometrically-unique actuating key. The key is mounted to the movable guard. Upon opening of the guard the NC contact(s) are forced to open through a direct (non-resilient) mechanical linkage with the actuating key. These positive-break NC contacts assure circuit interruption (and machine stoppage) upon removal of the actuator key. (The NO contact closes upon key removal.)

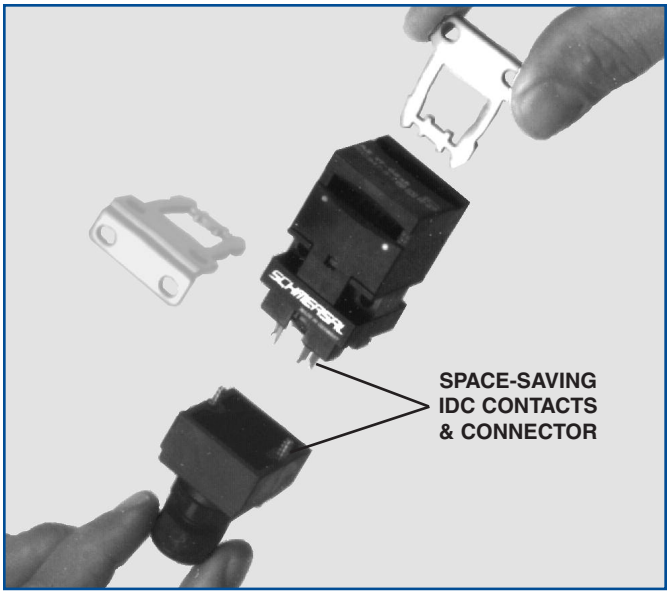
When the guard is closed, the actuating key forces the NC contacts to close and the NO contacts to re-open.

Typical Applications

The AZ17 is intended for use as a safety interlock switch on movable machine guards which, when open, expose the operator/maintenance personnel to machine hazards. Typical applications are the interlocking of protective gratings, access doors/gates, hinged covers, access panels and other movable guards.

Features & Benefits

- **Compact design** … only 1¼" × 1¼" × 3". Ideal where space is limited.
- **Insulation Displacement Connector (IDC)** … facilitates fast, easy installation.
- **Watertight design** … meets IP67 washdown requirements.
- **Eight optional key entry locations** … depending upon mounting arrangement.
- **Highly tamper-resistant** … difficult to defeat with simple tools, tape, bent wires, etc. Reduces liability exposure.
- **"Positive-break" NC contacts** … assure interruption of safety circuit upon actuator key removal.
- **High-strength, stainless-steel actuator key** … tolerant to mechanical abuse without damage.
- **Rugged, corrosion-resistant, high-impact glass-fibre reinforced housing** … tolerates the most hostile environments.
- **"Padlockable" key for added security during maintenance.**
- **Designed to meet Performance Level requirements of EN ISO 13849-1 and Safety Control Categories of EN 954-1.**
- **Several styles of actuator key** … accommodates a wide variety of movable guards.



Note: Available with optional M12x1 quick-connect.

POSITIVE-BREAK® is a trademark of SCHMERSAL

AZ17 AVAILABLE MODELS AND ACCESSORIES

AVAILABLE STANDARD MODELS
(Actuator key must be ordered separately)

Part Number	Contacts	Connection
AZ17-11ZK	1 NO & 1 NC	IDC Connection
AZ17-11ZRK		
AZ17-02ZK	2 NC	
AZ17-02ZRK		
AZ17-11ZK-ST	1 NO & 1 NC	M12x1 Quick Connect
AZ17-11ZRK-ST		
AZ17-02ZK-ST	2 NC	
AZ17-02ZRK-ST		
Solenoid-latching models available. (Model AZM170) See page 44		
Individually-coded key models available (Model AZ17zi) (For extra security in “high-risk” applications) See page 8.		

Notes: Pre-wired (5 meter length) cable entry models available. Add suffix “2243” for front of unit cable entry or suffix “2243-1” for rear cable entry.

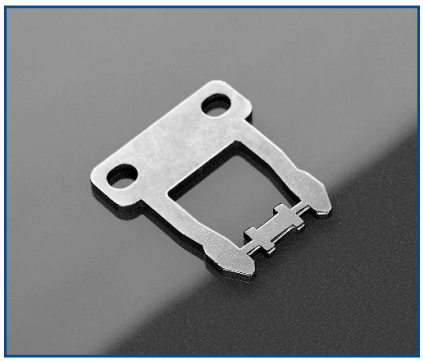
“ST” models use M12, 4 pin connections. Order connection cable A-K4P-M12-S-G-5M-1-X-A-1, or please see page 94 for connector cable descriptions.

ACTUATOR KEYS & ACCESSORIES

Part Number	Description
AZ17/170-B1	Standard key (7.87" minimum closing radius)
AZ17/170-B5	Right-angle key (7.87" minimum closing radius)
AZ17-B6	Flexible, close-radius key (1.97" minimum closing radius)
AZ17/170-B11	Elongated standard straight key (7.87" minimum closing radius)
AZ17/170-B15	Elongated right-angle key (7.87" minimum closing radius)
AZ17/170-B1-2245	Standard straight key with vibration-resistant mounting (7.87" minimum closing radius)
AZ17-B25-L-G1	B25 door handle actuator with star grip for left hand hinged guard
AZ17-B25-L-G2	B25 door handle actuator with T grip for left hand hinged guard
AZ17-B25-R-G1	B25 door handle actuator with star grip for right hand hinged guard
AZ17-B25-R-G2	B25 door handle actuator with T grip for right hand hinged guard
MS AZ 17-P	Adjustable mounting kit for parallel mounting. AZ17-B6 key required. See page 6.
MS AZ 17-R/P	Adjustable mounting kit for parallel or perpendicular mounting. AZ17-B6 key required of units with B6 keys.

SELECTED ACTUATOR KEYS (See page 7 for more details)

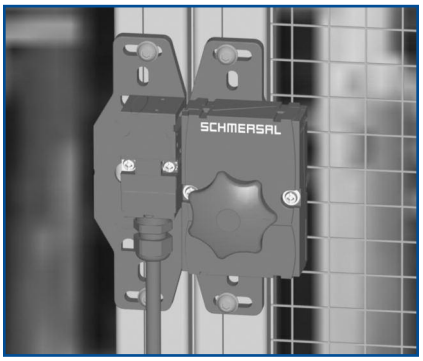
AZ17/170-B1



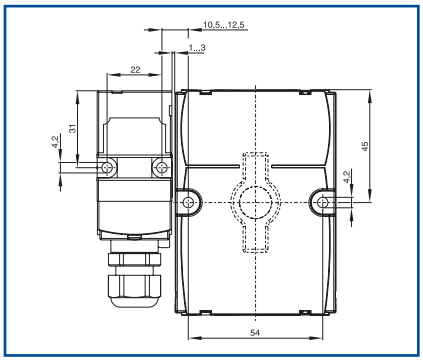
AZ17/170-B5

AZ17-B6

B25 DOOR HANDLE ACTUATORS



DIMENSIONS



Note: For detailed information on the B25 Door Handle Actuator, see page 82.

AZ17 TECHNICAL DATA

MECHANICAL SPECIFICATIONS

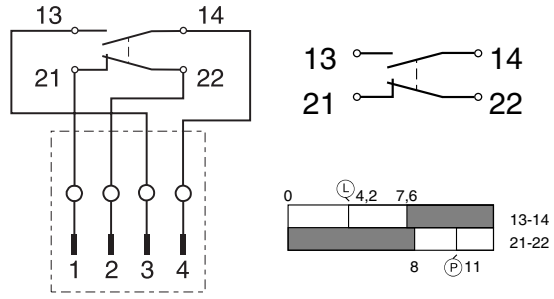
Housing	Glass-fibre reinforced, self-extinguishing thermoplastic
Actuator Key	Stainless steel, 1.4301
Degree of Protection	IP67
Holding Force	zk models: 1.2 pounds zrk models: 7 pounds
Travel for Positive-Break	8 mm (0.315 inches)
Closing Force	Approx. 12N (2.7 pounds)
Operating Temperature	–22°F to +175°F
Mechanical Life	> 10^6 operations
Conformity to Standards	IEC 947-5-1 CE EN 60947-5-1 BG-GS-ET-15 EN ISO 13849-1 UL EN 954-1 CSA
Minimum Closing Radius	1.97" (with AZ17-B6 actuator key) 7.87" (with B1, B5, B11 and B15 actuator key)

ELECTRICAL SPECIFICATIONS

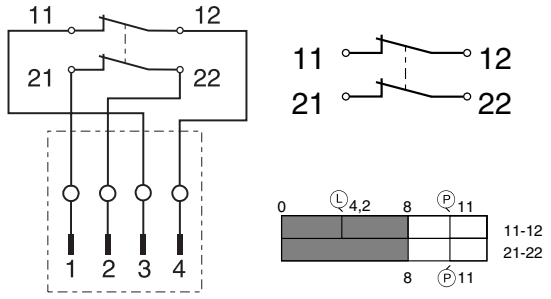
Contacts	Fine silver
Contact Configuration	Double-pole, double-break with electrically separated contact bridges
Contact Rating	4A/230VAC 2.5A/230VA (with “ST” quick-connect)
Switching Action	Slow-action, positive-break NC contacts
Short Circuit Protection	6A (time-delay)
Rated Isolation Voltage	250V
Type Terminals	Insulation displacement contacts & connector for 18AWG flexible stranded wire (0.75 mm^2)

SWITCHING DIAGRAMS & CONTACT SCHEMATICS

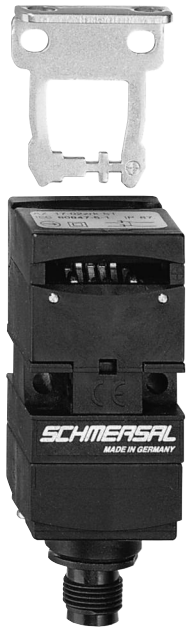
AZ17-11z

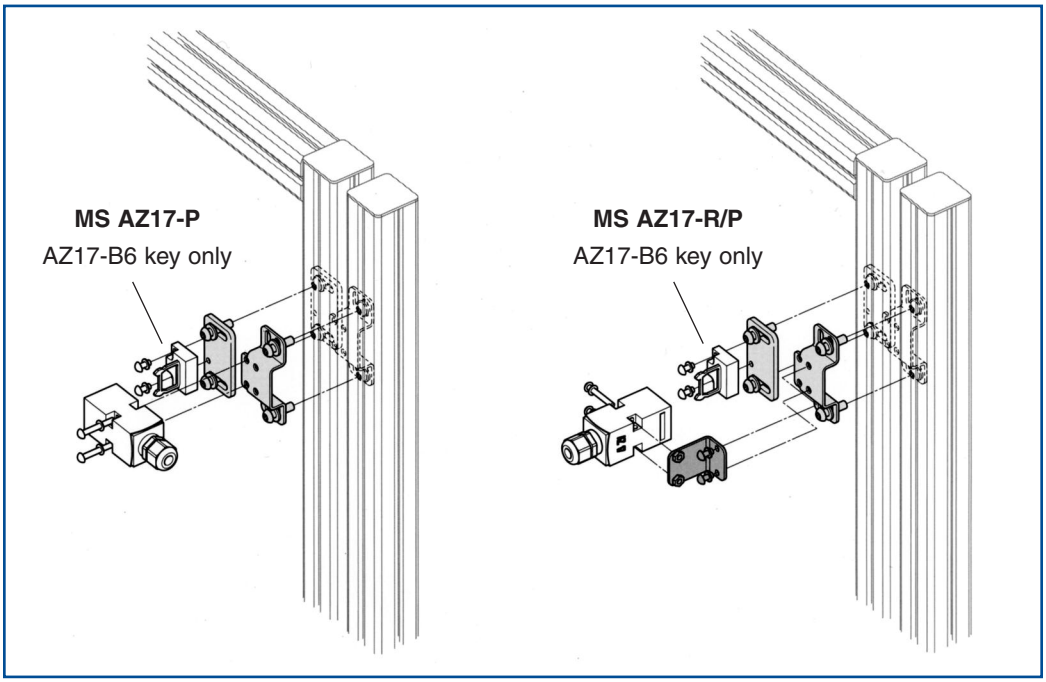


AZ17-02z

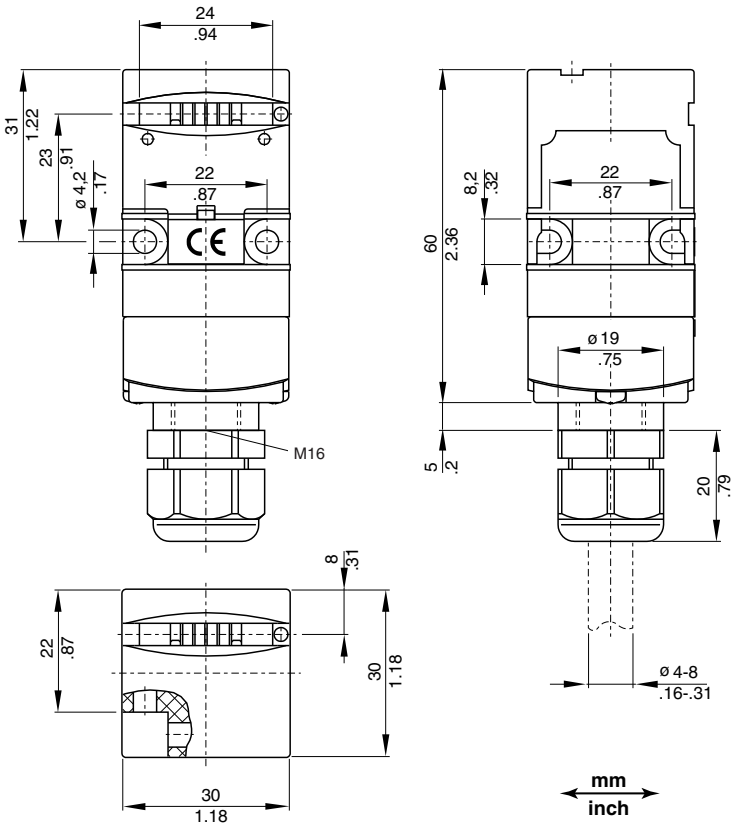


MS AZ 17 ADJUSTABLE MOUNTING KIT

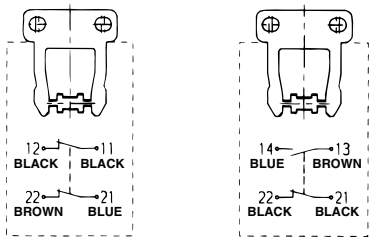




DIMENSIONS

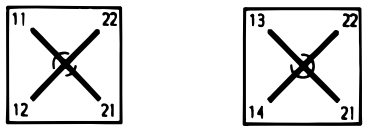


Switching Symbols **(Colors identify -2243 factory prewired models)**



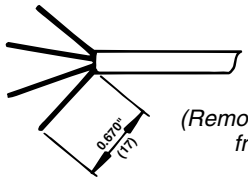
AZ17-02z **AZ17-11z**

Connections



AZ17-02z **AZ17-11z**

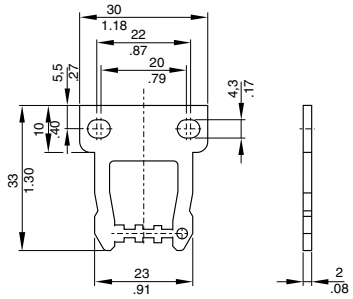
same polarity; type four enclosure



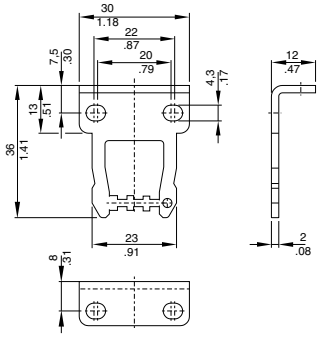
(Remove outer sleeve from cable)

ACTUATOR KEYS

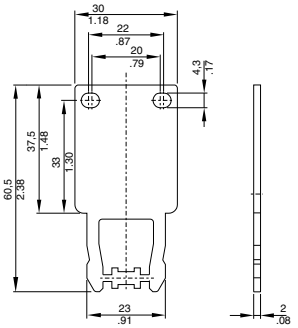
AZ17/170-B1



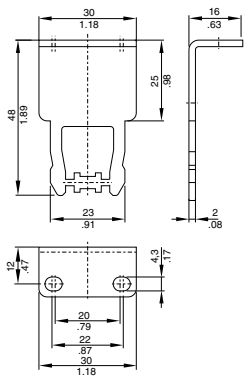
AZ17/170-B5



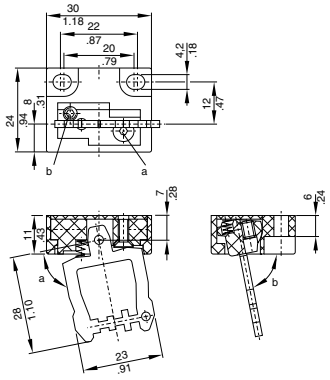
AZ17/170-B11



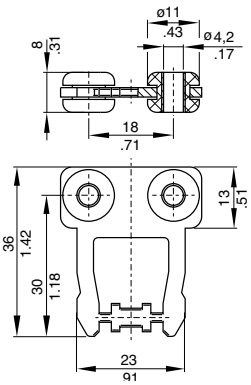
AZ17/170-B15



AZ17-B6

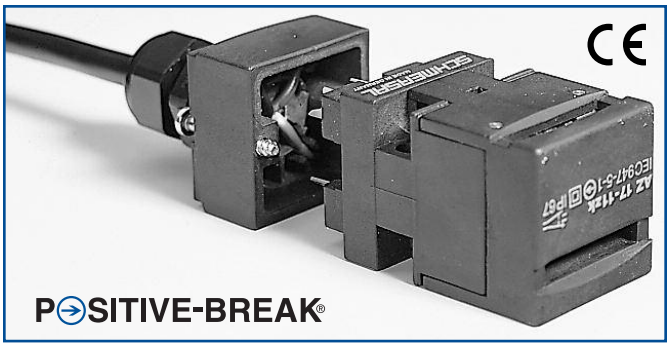


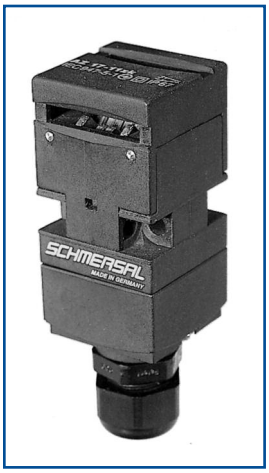
AZ17/170-B1-2245

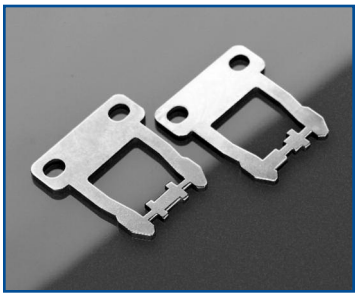


SERIES AZ17zi

Individually-Coded Movable Machine Guard Safety Interlock Switch



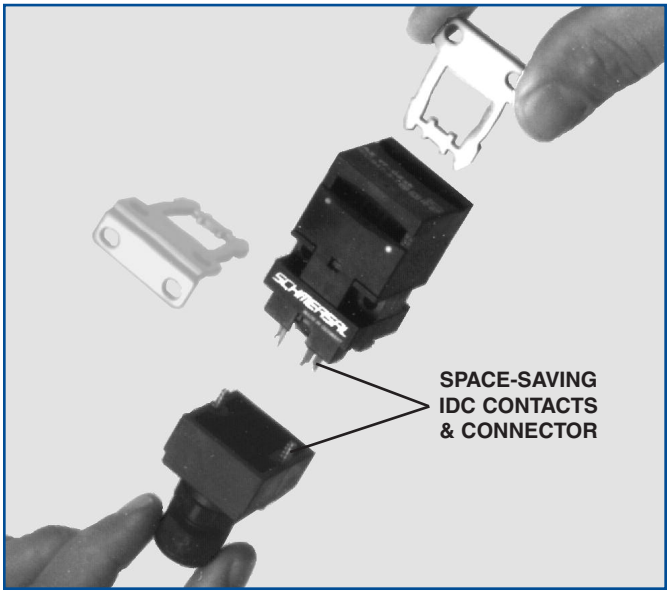




INDIVIDUALLY-CODED ACTUATOR KEYS

Features & Benefits

- **Highly tamper-resistant actuating mechanism** … difficult to defeat with simple tools, tape, bent wires, etc. Reduces liability exposure.
- **Individually-coded actuator key** … provides extra security in high-risk applications.
- **Compact design** … only 1¼" × 1¼" × 3". Ideal where space is limited.
- **Non-removable actuating head** … heightens tamper-resistance.
- **Four optional key entry locations** … provide installation flexibility.
- **"Positive-Break" NC contacts** … assure circuit interruption upon actuator key removal.
- **Watertight design** … meets IP67 washdown requirements.
- **High-strength, stainless-steel actuator key** … tolerates mechanical abuse without damage.
- **Rugged, corrosion-resistant housing** … tolerates the most hostile environments.
- **Wide selection of accessories** … to meet diverse application requirements.
- **Padlockable key** … for added security during equipment maintenance.
- **Designed to meet Performance Level requirements of EN ISO 13849-1 and Safety Control Categories of EN 954-1.**



Description

The compact Series AZ17zi are designed for use with movable machine guards which must be closed for operator safety. Their tamper-resistant design, and positive-opening NC contacts, provide a significantly higher level of safety than conventional spring-driven switches whose contacts can weld/stick shut. Their IP67 rating makes them ideal for interlocking safety guards in hostile environments.

Operation

The AZ17zi is a two-piece, electromechanical safety interlock switch. It consists of a rugged switch mechanism and an individually-coded, geometrically-unique actuating key. The key must be directly hard-mounted to the movable guard. Upon opening of the guard, the normally-closed (NC) contact(s) are forced to open through a direct (non-resilient) mechanical linkage with the actuating key. The positive-break NC contacts assure circuit interruption (and machine stoppage) upon removal of the actuator key. (The NO contacts close upon key removal.)

When the guard is closed, the actuating key forces the NC contacts to re-close, and any NO contacts to re-open. The tamper-resistant design prevents bypassing with simple tools, bent wires or other readily available means.

Typical Applications

The AZ17zi is intended for use as a safety interlock on movable machine guards which, when open, expose the operator/maintenance personnel to machine hazards. Typical applications are the interlocking of protective gratings, hinged covers, access panels and other movable guards.

AZ17zi AVAILABLE MODELS AND ACCESSORIES

AVAILABLE MODELS
(Includes Individually-Coded Actuator Key)

Part Number	Actuator Key Type	Contacts
Units with 1.2 lbs key retention force:		
AZ17-11Zi-B1	Straight key	1 NO & 1 NC
AZ17-11Zi-B5	Right Angle key	
AZ17-11Zi-B6R	Flexible mounting – right	
AZ17-11Zi-B6L	Flexible mounting – left	
AZ17-02Zi-B1	Straight key	2 NC
AZ17-02Zi-B5	Right Angle key	
AZ17-02Zi-B6R	Flexible mounting – right	
AZ17-02Zi-B6L	Flexible mounting – left	
Units with 7 lbs key retention force:		
AZ17-11ZRi-B1	Straight key	1 NO & 1 NC
AZ17-11ZRi-B5	Right Angle key	
AZ17-11ZRi-B6R	Flexible mounting – right	
AZ17-11ZRi-B6L	Flexible mounting – left	
AZ17-02ZRi-B1	Straight key	2 NC
AZ17-02ZRi-B5	Right Angle key	
AZ17-02ZRi-B6R	Flexible mounting – right	
AZ17-02ZRi-B6L	Flexible mounting – left	

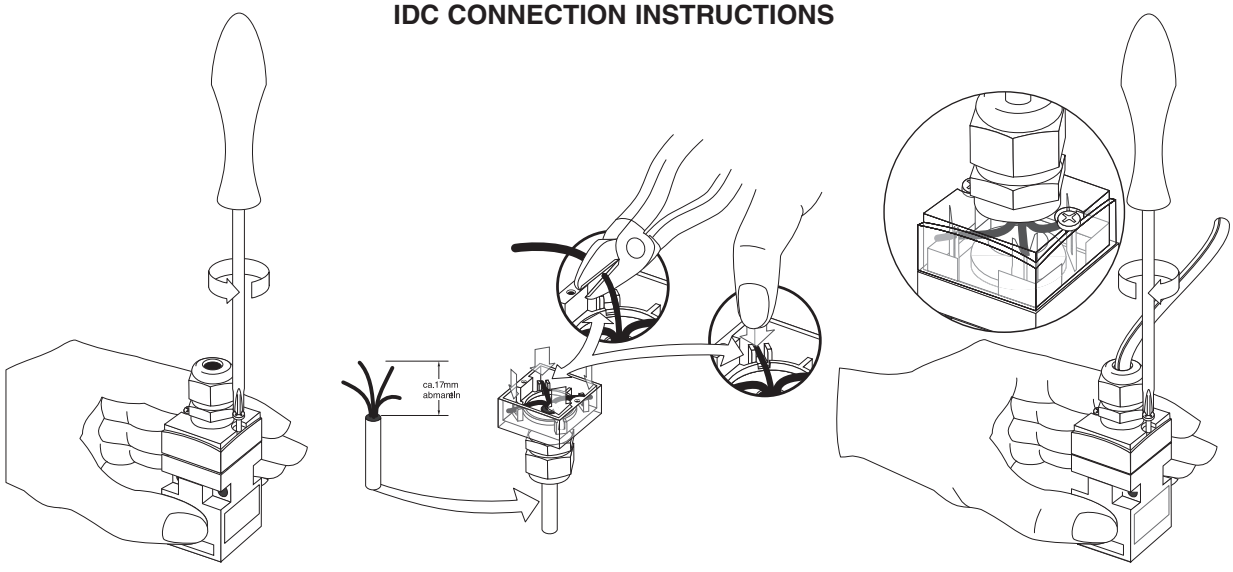
Note: Models also available with M12x1 Quick connect, add "-ST" to part number before key type (AZ17-02Zi-ST-B1)

OPTIONAL ACCESSORIES

Part Number	Description
MS AZ 17-P	Adjustable mounting kit for parallel mounting of units with B6 keys. (See installation on Page 10)
MS AZ 17-R/P	Adjustable mounting kit for parallel or perpendicular mounting of units with B6 keys. (See installation on Page 10)

Mounting kits require use of the -B6 key

IDC CONNECTION INSTRUCTIONS



AZ17zi TECHNICAL DATA

MECHANICAL SPECIFICATIONS

Housing	Glass-fibre reinforced, self-extinguishing thermoplastic
Actuator Key	Stainless steel, 1.4301
Degree of Protection	IP67
Key Retention Force	zi models: 1.2 pounds zir models: 7 pounds
Travel for Positive-Break	8 mm (0.315 inches)
Closing Force	Approx. 12N (2.7 pounds)
Operating Temperature	–22°F to +175°F
Mechanical Life	> 10^6 operations
Conformity to Standards	IEC 947-5-1 EN 954-1 EN 60947-5-1 CE EN ISO 13849-1 UL BG-GS-ET-15 CSA
Minimum Closing Radius	1.97" (with B6L or B6R actuator key) 7.87" (with B1 or B5 actuator key)

ELECTRICAL SPECIFICATIONS

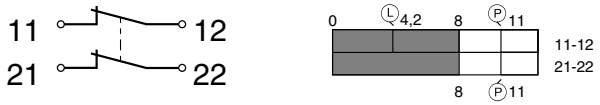
Contacts	Fine silver
Contact Configuration	Double-pole, double-break with electrically separated contact bridges
Contact Rating	4A/230VAC
Switching Action	Slow-action, positive-break NC contacts
Short Circuit Protection	6A (time-delay)
Rated Isolation Voltage	250V
Type Terminals	Insulation displacement contacts & connector for 18AWG flexible stranded wire (0.75 mm^2)

Note: Pre-wired (5 meter length) cable entry models available. See optional accessories.

SWITCHING DIAGRAMS & CONTACT SCHEMATICS

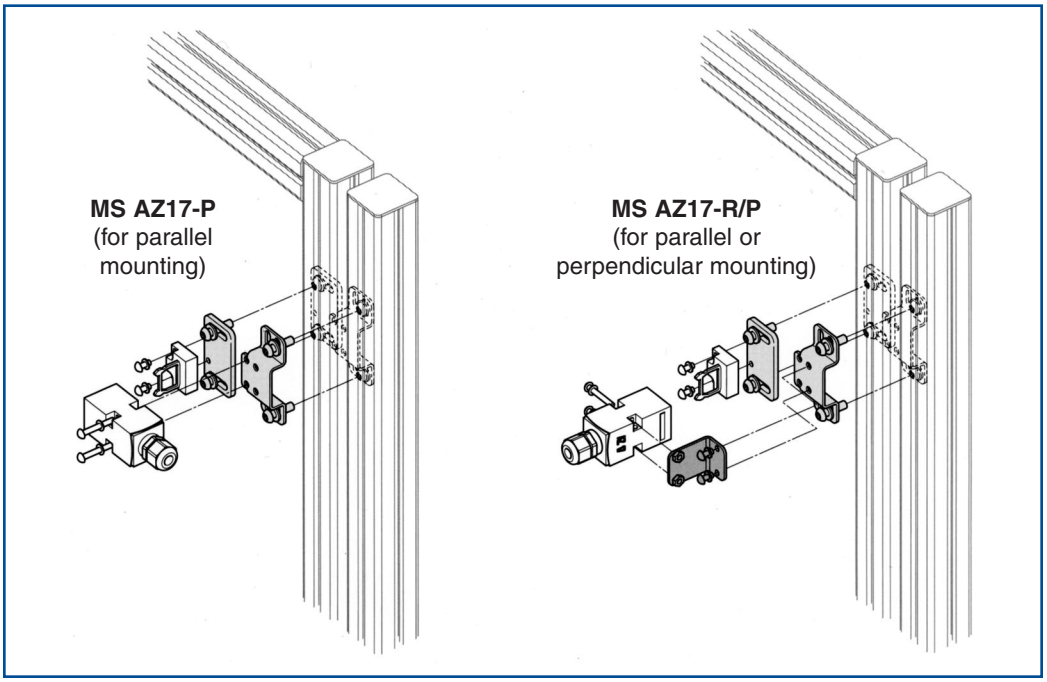
AZ17-11zi

AZ17-02zi

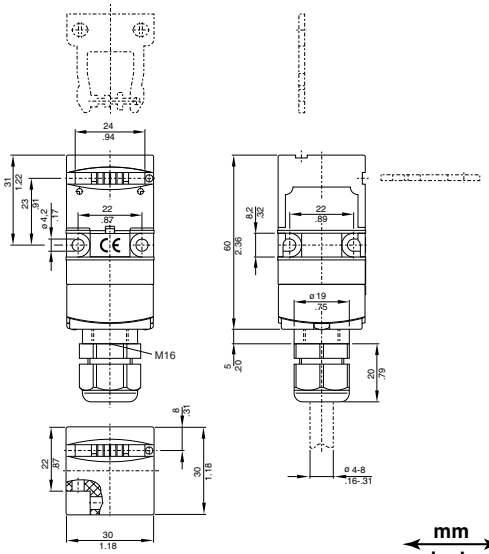


MS AZ 17 ADJUSTABLE MOUNTING KIT

(Eases installation and facilitates adjustments due to guard misalignment)

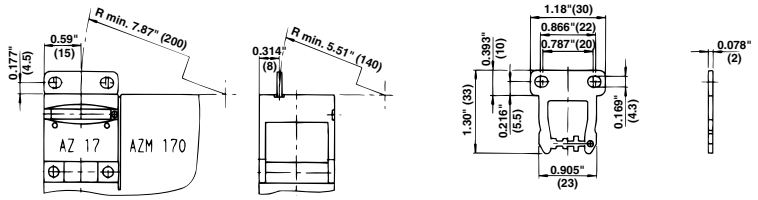


DIMENSIONS

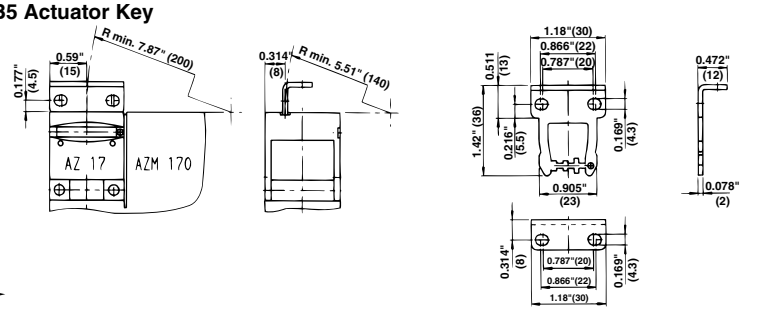


mm
inch

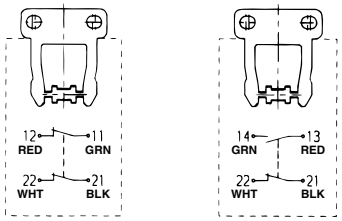
B1 Actuator Key



B5 Actuator Key

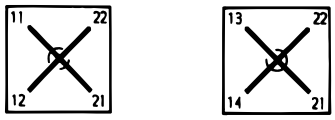


Switching Symbols **(Colors identify -2243 factory prewired models)**



AZ17-02zi **AZ17-11zi**

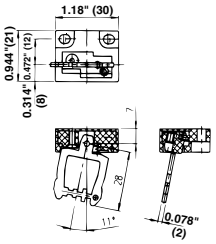
Connections



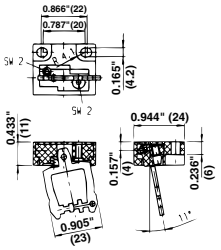
AZ17-02zi **AZ17-11zi**

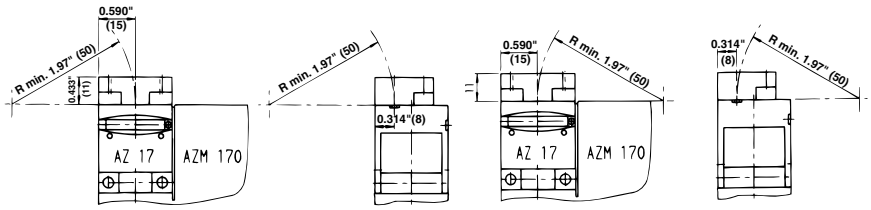
same polarity; type four enclosure

B6L Actuator Key

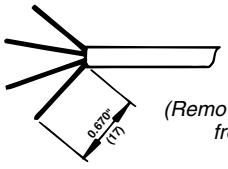


B6R Actuator Key





(Minimum radius: 50mm)



(Remove outer sleeve from cable)

All dimensions in inches (mm)

SERIES AZ15/16

Tamper-Resistant Movable Machine Guard Safety Interlock Switch

CE

P⊖SITIVE-BREAK®

Description

The Series AZ15/16 is designed for use with movable machine guards/access gates which must be closed for operator safety. Their positive-opening NC contacts provide a significantly higher level of safety than conventional spring-driven switches whose contacts can weld or stick shut. And their tamper-resistant design prevents bypassing with simple tools, bent wires or other readily available means. Their IP67 rating makes them ideal for interlocking safety guards in hostile environments.

Operation

The AZ15/16 electromechanical safety interlock switch consists of a rugged switch mechanism and a geometrically-unique actuating key. The key is mounted to the movable guard. Upon opening of the guard the NC contact(s) are forced to open through a direct (non-resilient) mechanical linkage with the actuating key. These positive-break NC contacts assure circuit interruption (and machine stoppage) upon removal of the actuator key. (The NO contact closes upon key removal.)

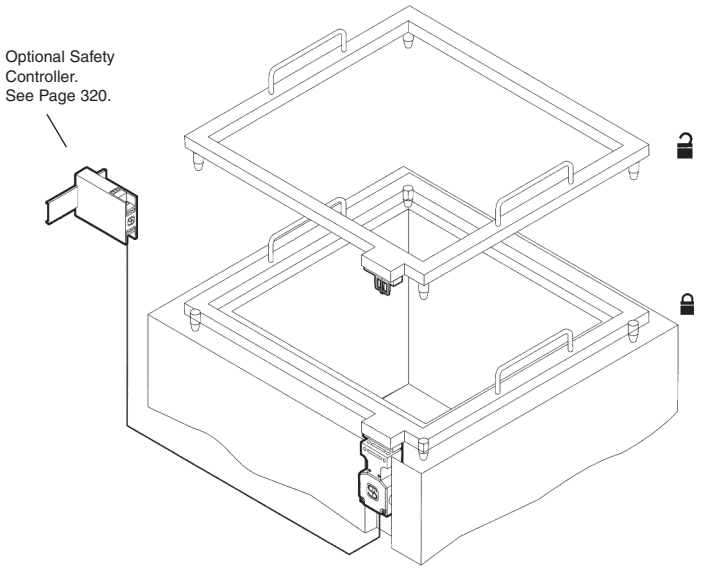
When the guard is closed, the actuating key forces the NC contacts to close and the NO contacts to re-open.

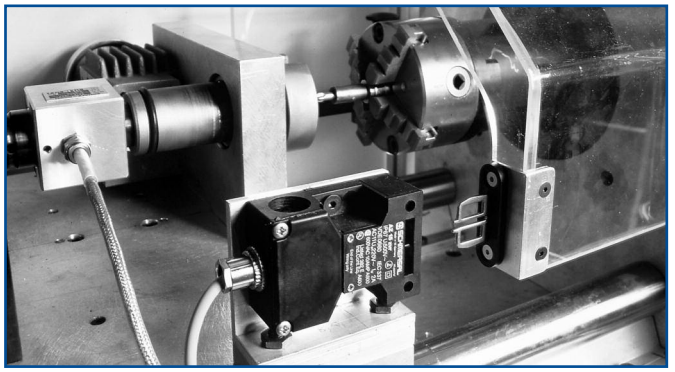
Typical Applications

The AZ15/16 is intended for use as a safety interlock switch on movable machine guards which, when open, expose the operator/maintenance personnel to machine hazards. Typical applications are the interlocking of protective gratings, access doors/gates, hinged covers, access panels and other movable guards.

Features & Benefits

- **Highly tamper-resistant actuating mechanism** … difficult to defeat with simple tools, tape, bent wires, etc. Reduces liability exposure.
- **Non-removable actuating head** … heightens tamper-resistance.
- **Four optional key entry locations** … provide installation flexibility.
- **Individually-coded actuator key option** … provides extra security in high-risk applications. See AZ16zi on page 18.
- **"Positive-Break" NC contacts** … assure circuit interruption upon actuator key removal.
- **High key-retention force (7 pounds)** … eliminates inadvertent opening of guard due to shock/vibration.
- **Watertight design** … meets IP67 washdown requirements.
- **High-strength, stainless-steel actuator key** … tolerates mechanical abuse without damage.
- **Rugged, corrosion-resistant housing** … tolerates the most hostile environments.
- **Wide selection of accessories** … to meet diverse application requirements.
- **Padlockable key** … for added security during equipment maintenance.
- **Designed to meet Performance Level requirements of EN ISO 13849-1 and Safety Control Categories of EN 954-1.**
- **Explosion-proof model and M12x1 quick-connect ("ST") available** (Please consult factory).





P⊖SITIVE-BREAK® is a trademark of SCHMERSAL

AZ15/16 AVAILABLE MODELS AND ACCESSORIES

AVAILABLE MODELS
(Includes ½" NPT Plastic Adapter
Actuator Key Sold Separately)**

Part Number	Contacts (with actuator key inserted)
AZ15ZVK (key spring returned)	1 NC
AZ15ZVRK (key maintained upon insertion)*	1 NC
AZ16ZVK (key spring returned)	1 NO & 1 NC
AZ16ZVRK (key maintained upon insertion)*	1 NO & 1 NC
AZ16-02ZVK (key spring returned)	2 NC
AZ16-02ZVRK (key maintained upon insertion)*	2 NC
AZ16-12ZVK (key spring returned)	1 NO & 2 NC
AZ16-12ZVRK (key maintained upon insertion)*	1 NO & 2 NC
AZ16-03ZVK (key spring returned)	3 NC
AZ16-03ZVRK (key maintained upon insertion)*	3 NC

*Feature 7 pound key retention force. For lighter key retention force (1-2 pounds) add suffix "2254".

**To order unit with cordgrip instead of ½" NPT adapter, add suffix "CG" to part number...eg. AZ15-zvk-CG.

Add suffix -1637 to basic part number for Gold contacts

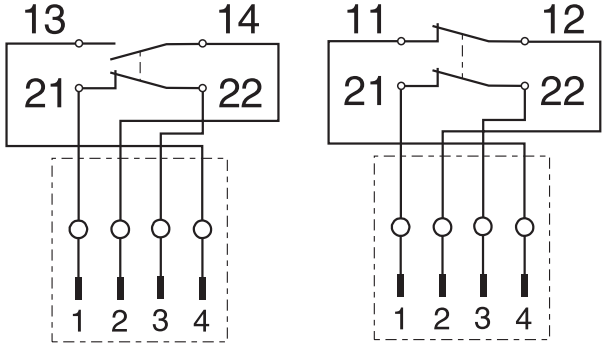
Add suffix "-ST" to part number for M12x1, 4 pin quick-connect and order connection cable A-K4P-M12-S-G-5M-1-X-A-1, or see page 94 for connector cable descriptions.

ACCESSORIES
for AZ15/16 Keyed-Interlock Switches

Part Number	Description
AZ15/16-1476	Key entry closure caps (for unused entry slots)
M20-CG	Cord grip (cable gland)
M20-½"NPT-P	Plastic ½" NPT adapter
M20-½"	Metal ½" NPT adapter
PL-M20-24V	24VAC/DC pilot light kit
PL-M20-120V	120VAC/DC pilot light kit
SZ16/335	Actuator Key Lockout Device (Accepts up to 6 padlocks)
AZ15/16-AP	Alignment Pins (Set of 2)
MS AZ 15/16-P	Adjustable mounting kit for parallel mounting (See illustration Page 16)
MS AZ 15/16-R/P	Adjustable mounting kit for parallel and perpendicular mounting (See illustration Page 16)

MS mounting kits require the use of the -B6 key

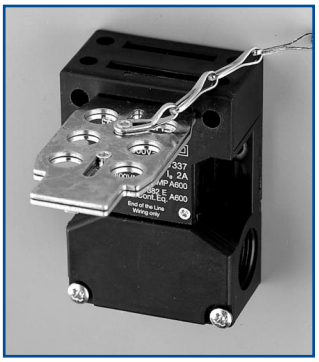
ST PIN CONNECTIONS



ACTUATOR KEYS

Part Number	Description
AZ15/16-B1	Standard Key (5.9" minimum closing radius)
AZ15/16-B2	Small radius actuating key (1.8" minimum closing radius)
AZ15/16-B3	Small radius actuating key (1.3" minimum closing radius)
AZ15/16-B6	Flexible-movement actuating key
AZ15/16-B1-2177	Funnel entry adapter with elongated straight actuating key
AZ15/16-B6-2177	Funnel entry adapter with elongated flexible-movement actuating key
AZ15/16-B1-KRH	Key Removal Hand-Grip Assembly with Key Retention Chain (for use with AZ15...zvrk and AZ16...zvrk)
AZ15/16-B1-2024	Actuator key with gasketed key caps
AZ15/16-B1-1747	Actuator key with door holding magnet kit (7 pound holding force) (for use with AZ16…zvr-2254 models)
AZ15/16-B2-1747	
AZ15/16-B3-1747	
AZ15/16-B1-2053	Actuator key with ball latch kit (Adjustable holding force up to 22 pounds) (For use with AZ16...zvrk)
AZ16-STS30-01	STS Door Handle kits for use with AZ16 switches. (See page 77 for details.)
AZ16-STS30-02	
AZ16-STS30-03	
AZ16-STS30-04	
AZ16-STS30-05	
AZ16-STS30-06	
AZ16-STS30-07	
AZ16-STS30-08	

Actuator Key Removal Handle AZ15/16-B1-KRH



Lockout Device SZ16/335 (padlock not included)

AZ15/16-2053 with ball catch Holding force up to 22 pounds

AZ15/16-1747 with holding magnet Holding force 7 pounds

AZ15/16 TECHNICAL DATA

MECHANICAL SPECIFICATIONS

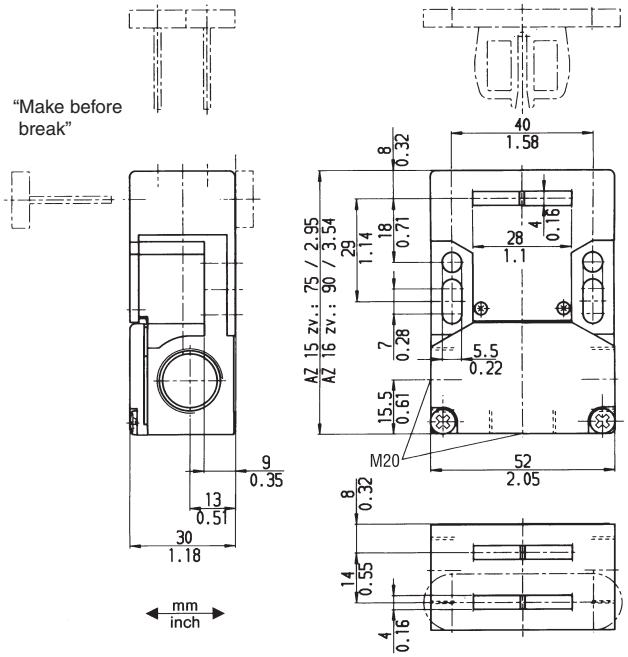
Housing	Glass-fibre reinforced, self-extinguishing thermoplastic
Actuator Key	Stainless steel (defeat-resistant design)
Degree of Protection	IP67
Travel for Positive-Break	8 mm (0.315 inches)
Key Ejection Force	"-zv" models: 3N (0.7 pounds)
Key Retention Force	"-zvr-2254 models: 5N (1.2 pounds) "-zvr" models: 30N (7 pounds)
Closing Force	Approx. 15N (3.4 pounds)
Operating Temperature	–22°F to +175°F
Mechanical Life	> 1 million operations
Conformity to Standards	IEC 947-5-1 BG-GS-ET-15 EN 60947-5-1 UL EN ISO 13849-1 CSA EN 954-1 TUV CE
Minimum Closing Radius	1.3" (with B3 actuator key) 1.8" (with B2 actuator key) 5.9" (with B1 actuator key)

ELECTRICAL SPECIFICATIONS

Contacts	Fine silver
Contact Configuration	Double-pole, double-break with electrically separated contact bridges
Contact Gap	2×2mm (minimum)
Contact Rating	4A/230VAC (A600) 2.5A/230VAC (with M12x1 quick-connect)
Switching Action	Slow-action, positive-break NC contacts
Short Circuit Protection	Fuse 6A (time-delay)
Rated Isolation Voltage	500VAC
Rated Impulse Withstand Voltage	6kV
Type Terminals*	Screw terminals with self-lifting clamps for up to 13 AWG flexible stranded wire (2.5mm²)

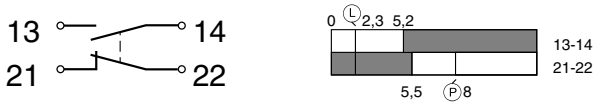
* Units available with M12x1 quick-connect.
(Please consult factory).

DIMENSIONS

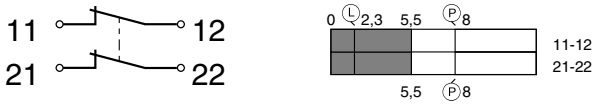


SWITCHING DIAGRAMS & CONTACT SCHEMATICS

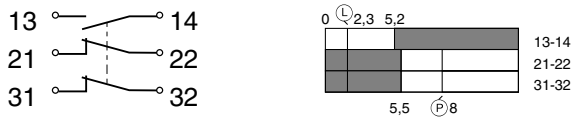
AZ16z



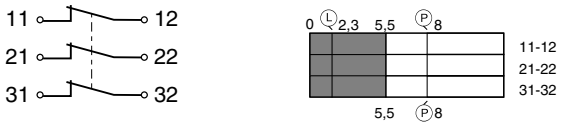
AZ16-02z



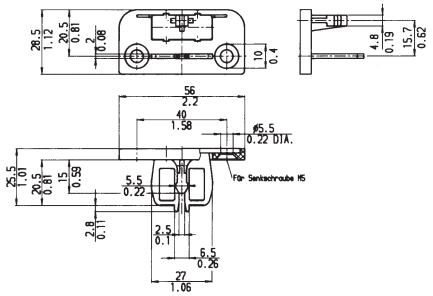
AZ16-12z



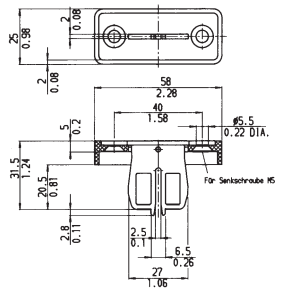
AZ16-03z



AZ15/16-2053 Ball Latch Kit

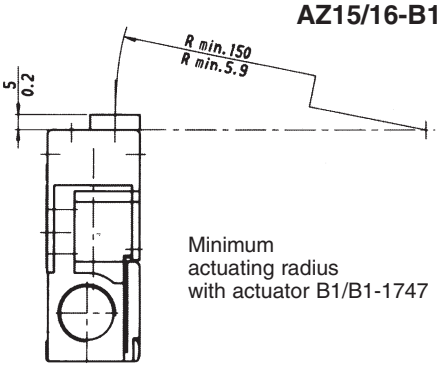


AZ15/16-2024 Gasketed Key Caps

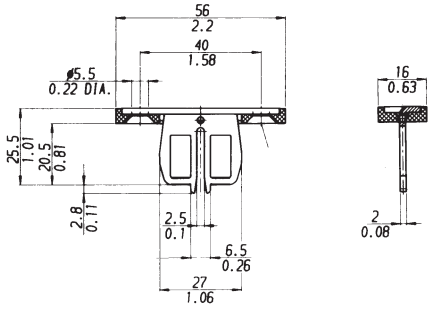


AZ15/16 ACTUATOR KEY SPECIFICATIONS

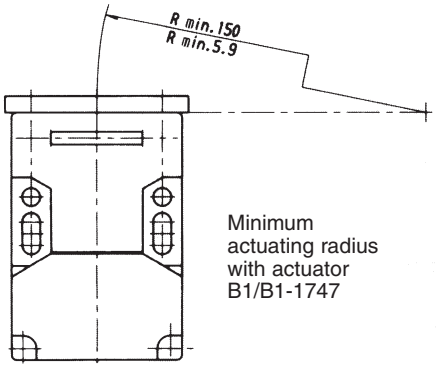
AZ15/16-B1 Actuator Key



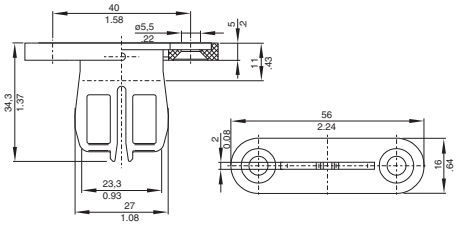
Minimum actuating radius with actuator B1/B1-1747



AZ15/16-B1-2177 Actuator Key

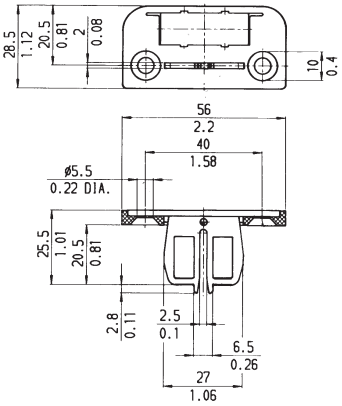


Minimum actuating radius with actuator B1/B1-1747



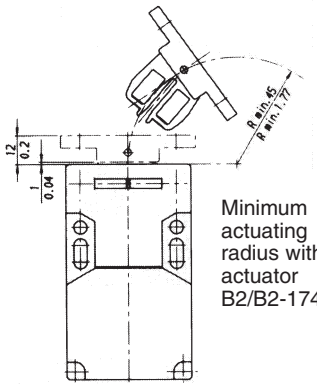
Actuator B1 is standard for AZ15/16; it allows a minimum actuating radius of 150 mm. **Please note that the center of rotation must be in the same plane as the upper edge of the safety switch.**

AZ15/16-B1 Actuator Key with AZ15/16-1747 Holding Magnet Kit



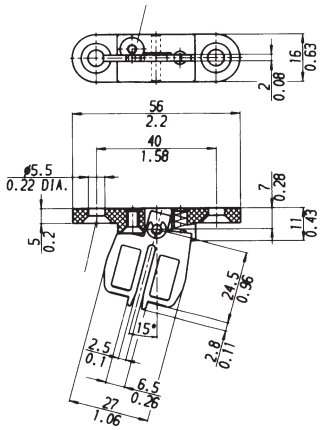
Ordering example:
Switch, holding magnet and actuator: AZ16-zv/B1-1747

AZ15/16-B2 Actuator Key



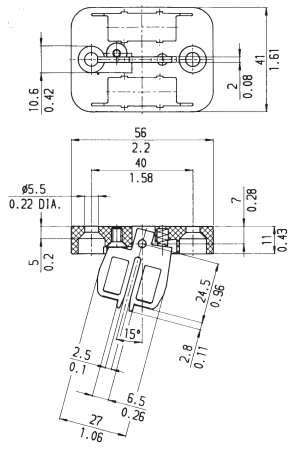
Minimum actuating radius with actuator B2/B2-1747

mm
inch

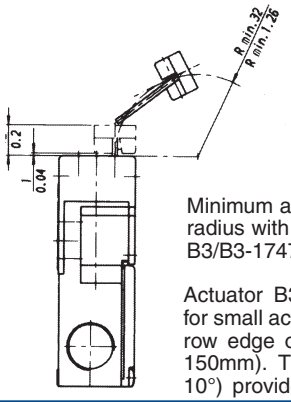


Actuator B2 is particularly suitable for **small actuating radii** over the wide edge of the actuator (R=45 to 150mm). The basic setting (angle 15°) provides a minimum radius of 45mm=1.8 in. For larger radii, the angle has to be adjusted correspondingly by turning the set screw counter-clockwise.

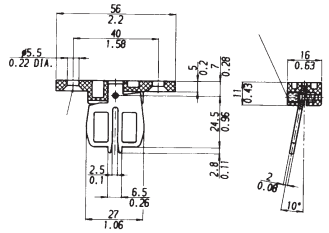
AZ15/16-B2 Actuator Key with AZ15/16-1747 Holding Magnet Kit



AZ15/16-B3 Actuator Key

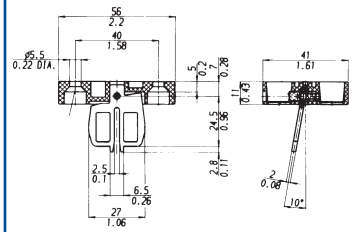


Minimum actuating radius with actuator B3/B3-1747



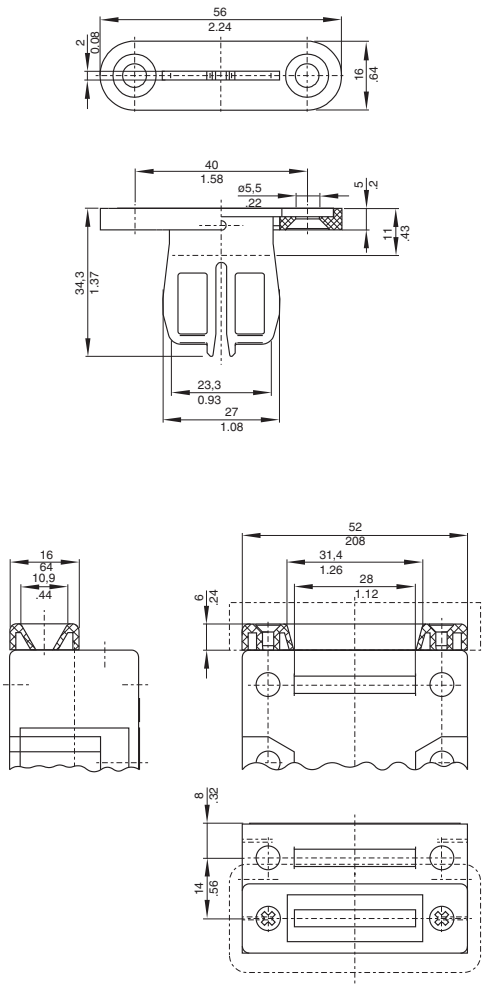
Actuator B3 is particularly suitable for small actuating radii over the narrow edge of the actuator (R=32 to 150mm). The basic setting (angle 10°) provides a minimum radius of 32mm=1.3in. For larger radii, the angle has to be adjusted correspondingly by turning the set screw clockwise.

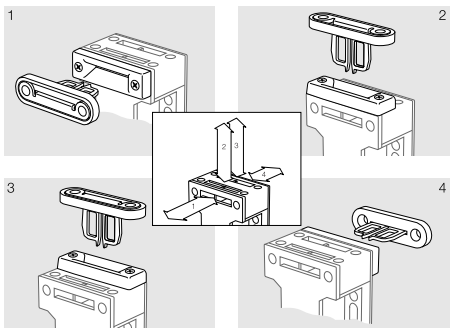
AZ15/16-B3 Actuator Key with AZ15/16-1747 Holding Magnet Kit



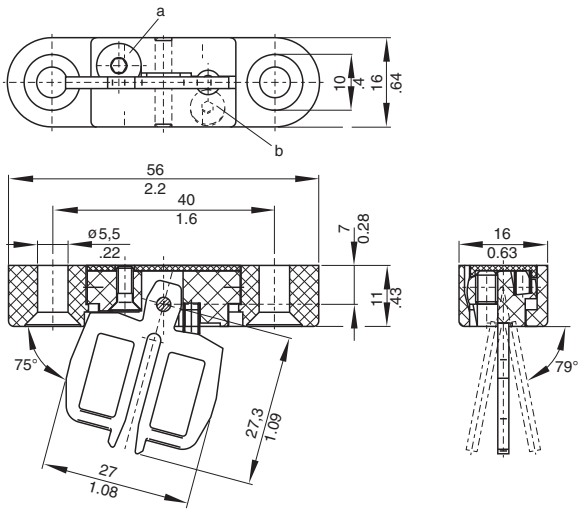
AZ15/16 ACTUATOR KEY SPECIFICATIONS

AZ15/16-B1-2177 Funnel Entry Adapter (with straight actuating key)





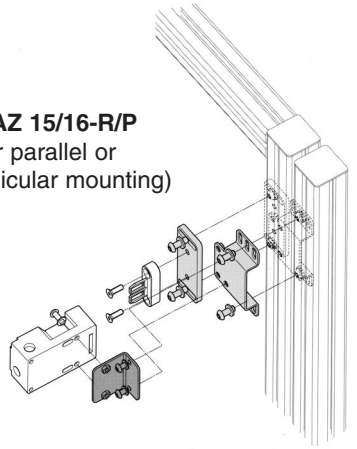
AZ15/16-B6 Flex Actuator Key



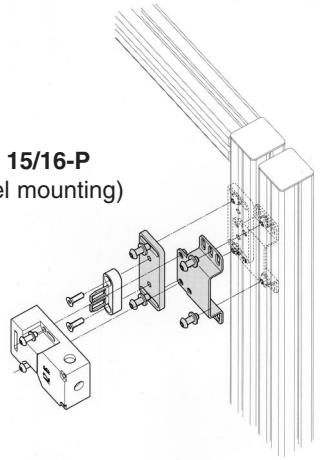
MS AZ 15/16 ADJUSTABLE MOUNTING KIT

(Eases installation and facilitates adjustments due to guard misalignment)

MS AZ 15/16-R/P
(for parallel or perpendicular mounting)



MS AZ 15/16-P
(for parallel mounting)



Safer
by
Design

SERIES AZ16zi

Individually-Coded Movable Machine Guard Safety Interlock Switch

CE

P⊖SITIVE-BREAK®

Features & Benefits

- **Highly tamper-resistant actuating mechanism** … difficult to defeat with simple tools, tape, bent wires, etc. Reduces liability exposure.
- **Individually-coded actuator key** … provides extra security in high-risk applications.
- **Non-removable actuating head** … heightens tamper-resistance.
- **Four optional key entry locations** … provide installation flexibility.
- **"Positive-Break" NC contacts** … assure circuit interruption upon actuator key removal.
- **Watertight design** … meets IP67 washdown requirements.
- **High-strength, stainless-steel actuator key** … tolerates mechanical abuse without damage.
- **Rugged, corrosion-resistant housing** … tolerates the most hostile environments.
- **Tamper-resistant key mounting screws** … deter bypassing.
- **Wide selection of accessories** … to meet diverse application requirements.
- **Padlockable key** … for added security during equipment maintenance.
- **Designed to meet Performance Level requirements of EN ISO 13849-1 and Safety Control Categories of EN 954-1.**

Description

The Series AZ16zi are designed for use with movable machine guards which must be closed for operator safety. Their tamper-resistant design, and positive-opening NC contacts, provide a significantly higher level of safety than conventional spring-driven switches whose contacts can weld/stick shut. Their IP67 rating makes them ideal for interlocking safety guards in hostile environments.

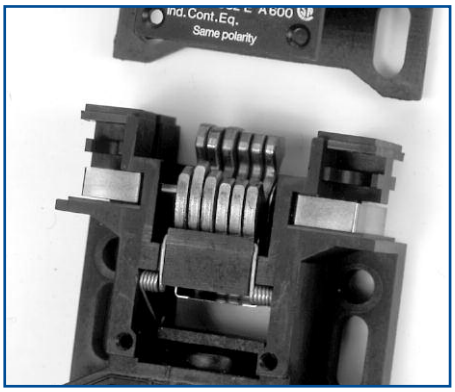
Operation

The AZ16zi is a two-piece, electromechanical safety interlock switch. It consists of a rugged switch mechanism and an individually-coded, geometrically-unique actuating key. The key must be directly hard-mounted to the movable guard. Upon opening of the guard, the normally-closed (NC) contact(s) are forced to open through a direct (non-resilient) mechanical linkage with the actuating key. The positive-break NC contacts assure circuit interruption (and machine stoppage) upon removal of the actuator key. (The NO contacts close upon key removal.)

When the guard is closed, the actuating key forces the NC contacts to re-close, and any NO contacts to re-open. The tamper-resistant design prevents bypassing with simple tools, bent wires or other readily available means.

Typical Applications

The AZ16zi is intended for use as a safety interlock on movable machine guards which, when open, expose the operator/maintenance personnel to machine hazards. Typical applications are the interlocking of protective gratings, hinged covers, access panels and other movable guards.



Patented geometrically-unique tumbler configuration

AZ16zi AVAILABLE MODELS AND ACCESSORIES

AVAILABLE MODELS
(Includes Individually-Coded Actuator Key and ½" NPT Plastic Adapter)

Part Number	Description	Contacts (with actuator key inserted)
AZ16-12zi-B1	Standard unit	1 NO & 2 NC
AZ16-03zi-B1		3 NC
AZ16-12zi-B1-1747	Standard unit with built-in key actuator magnet latch	1 NO & 2 NC
AZ16-03zi-B1-1747		3 NC
AZ16-12zi-B1-2024	Standard unit with built-in slot rubber seals on key actuator	1 NO & 2 NC
AZ16-03zi-B1-2024		3 NC
AZ16-12zi-B1-2053	Standard unit with built-in ball-latched key actuator	1 NO & 2 NC
AZ16-03zi-B1-2053		3 NC
AZ16-12zi-B1-2177	Standard unit with funnel entry adaptor	1 NO & 2 NC
AZ16-03zi-B1-2177		3 NC

AVAILABLE ACCESSORIES

Part Number	Description
M20-CG	Cord grip (cable gland)
M20-½"P	Spare Plastic ½" NPT adapter (One supplied with each unit)
M20-½"M	Metal ½" NPT adapter (optional)
AZ15/16-1476	Key entry closure caps (for unused entry slots)
SZ16/335	Lockout Device (accepts up to 6 padlocks)
PL-M20-24V	24VAC/DC LED Pilot Light Kit
PL-M20-120V	110VAC/DC Pilot Light Kit

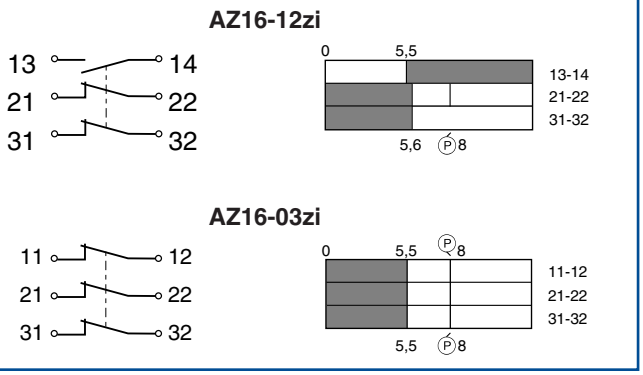
EXAMPLE OF INDIVIDUALLY-CODED KEYS
provide extra security in high-risk applications

AZ16zi TECHNICAL DATA

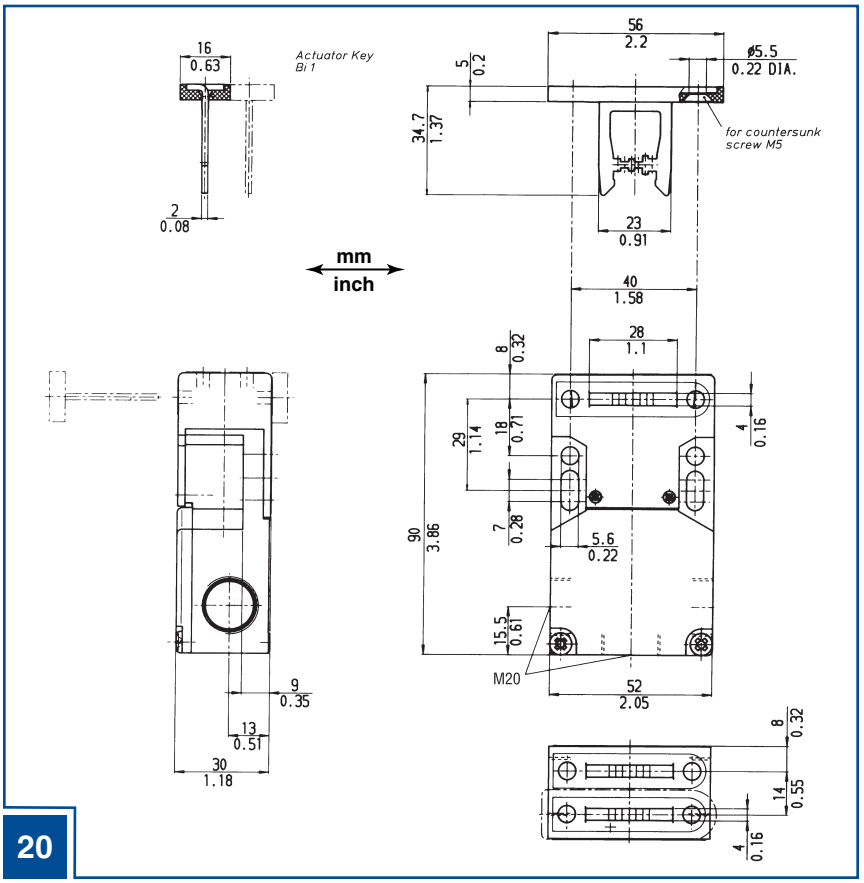
Housing	Glass-fibre reinforced, self-extinguishing plastic
Actuator Key	Stainless steel
Degree of Protection	IP67
Travel for Positive-Break	0.315 inches (8 mm)
Key Ejection Force	3 N (0.7 pounds)
Insertion Force	Approx. 15N (3.3 pounds)
Operating Temperature	–22°F to +175°F
Mechanical Life	1 million operations
Conformity to Standards	UL EN 954-1 CSA BG-GS-ET-15 EN ISO 13849-1 CE
Key Withdrawal Speed	2 meters/second (maximum)
Minimum Closing Radius	9.8" (250mm)

Contacts	Fine silver
Contact Configuration	Double-pole, double-break with electrically-separated contact bridges
Contact Gap	2 × 2 mm
Switching Action	Slow-action, positive-break NC contacts
Contact Rating	A600
Rated Insulation Voltage	500VAC
Thermal Current Rating	10A (300VAC)
Current Rating	6A @ 120VAC 4A @ 230VAC 2.5V/230VAC (with M12x1 quick-connect)
Rated Impulse Withstand Voltage	6kV
Short Circuit Protection	Fuse 6A (slow-blow)
Type Terminals	Screw terminals with self-lifting clamps for up to 2.5 mm² (AWG13) wire

SWITCHING DIAGRAMS & CONTACT SCHEMATICS

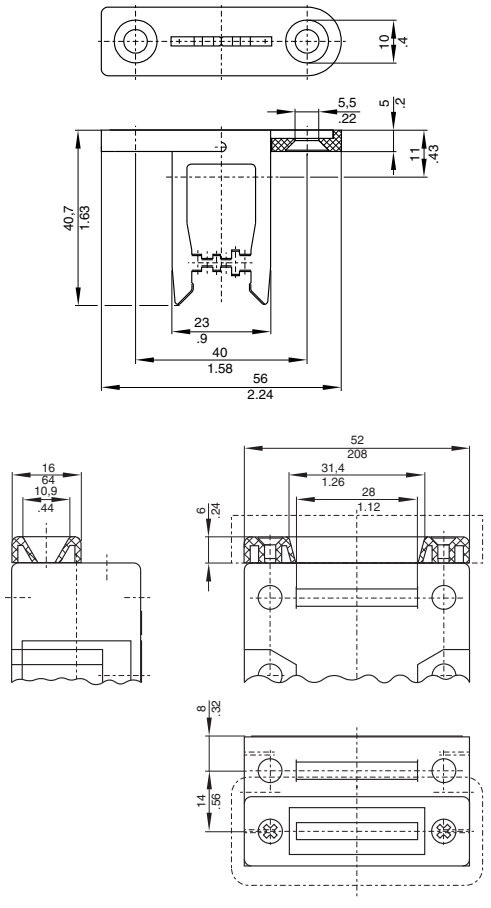


DIMENSIONS

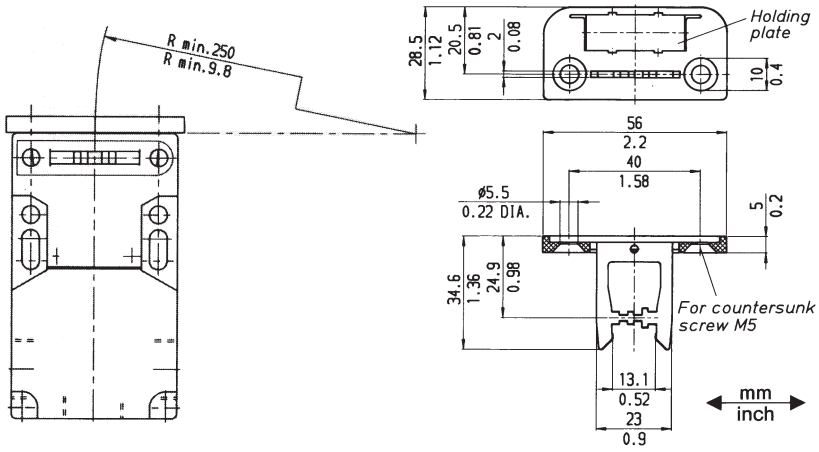


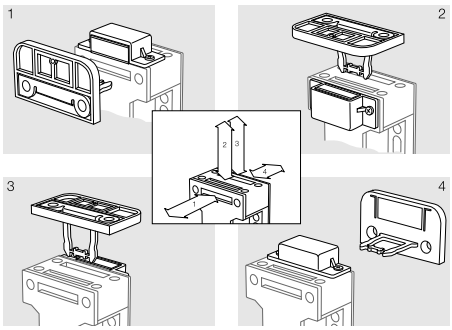
"-2177" Funnel Entry Adapter

**(Order as part of base switch…
e.g. AZ16-02Zi-B1-2177)**

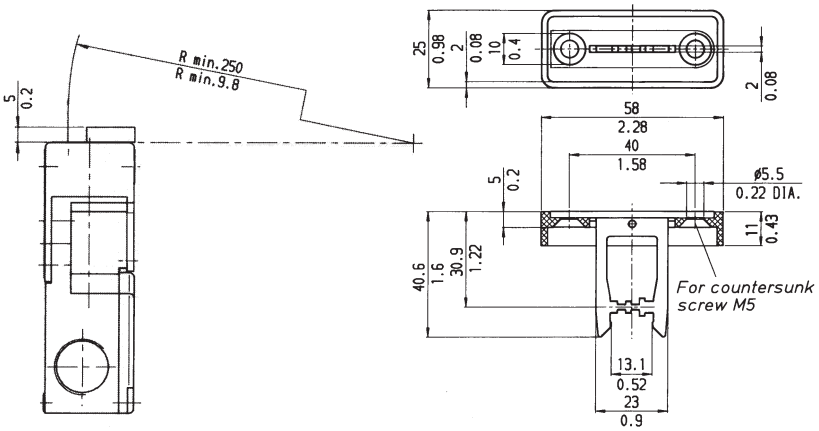


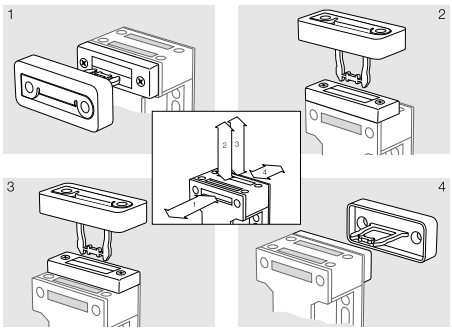
-1747 (for holding magnet)





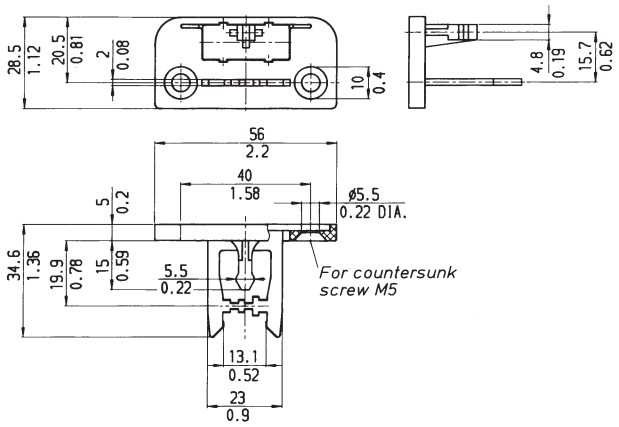
-2024 (for slot rubber seals)

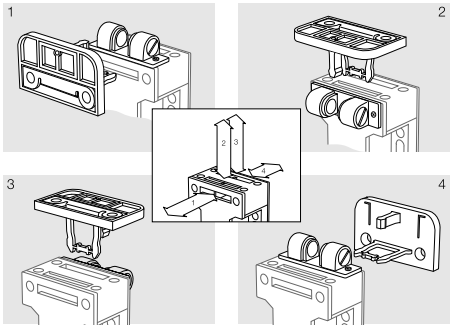




Applications: harsh environments
(coarse dirt, chips, flour…)

-2053 (for ball catch)





For holding light to medium-weight guards closed

SERIES AZ 200

Pulse-Echo Based Non-Contact Safety Interlock Switch

Description

The AZ 200 pulse-echo based non-contact safety interlock is designed for use with movable machine guards/access gates which must be closed for operator safety.

The AZ 200 consists of an interlock switch and actuator unit with door handle and optional emergency exit handle. The actuator is always inserted into its housing, protecting the actuator and the operator against damage and injury. Utilizing pulse-echo sensor technology, the actuator and interlock can have an offset of ±5 mm and the actuator still engages the interlock. A sensor stimulates a coil in the actuator, which in turns sends a signal back to the sensor. The pulse-echo technology provides diagnostic information and detects and indicates any misalignment at an early stage. Two different actuator designs accommodate both sliding or hinged guards.

The AZ 200 interlock is a dual channel design with two short-circuit proof, safe PNP outputs, each of which can switch up to 250 mA. It features one electronic diagnostic output that can signal errors before the safety outputs are switched off, thus enabling a controlled shutdown of the machine.

With continuous internal function tests, the monitoring of the safety outputs and the use of door detection sensors, up to 31 AZ 200 safety interlocks with one diagnostic output can be wired in series without detriment to the safety performance level/control category (PL_e to EN ISO 13849-1/ Category 4 to EN 954-1).

Typical Applications

The AZ 200 is intended for use as a safety interlock switch on movable machine guards which, when open, expose the operator/maintenance personnel to machine hazards. Typical applications are the interlocking of protective gratings, access panels and other movable guards. The AZ 200 is suitable for both sliding guards and hinged guards.

Features & Benefits

- **Tamper resistant …** frequency-matched switch and actuator required for operation.
- **Non-contact sensing …** for long term reliability.
- **Dual purpose handle …** modern, ergonomic design—no additional door handles are needed.
- **Integral LED diagnostics …** indicates operating states
- **Integral self-monitoring and door detection sensors …** satisfy requirements of Safety PL_e to EN ISO 13849-1, Control Category 4 to EN 954-1. **See Note on next page.*
- **One-hand emergency release …** hazardous area can be left quickly and safely.
- **Switch and actuator do not protrude into door opening …** no risk of injury or damage from a protruding actuator.
- **Dual PNP 250 mA safety outputs …** for application versatility.
- **Designed for "daisy chaining" …** up to 31 devices, max 200 m, can be wired in series without detriment to safety performance level.

AVAILABLE AZ200 MODELS

Part Number	Description
Screw Terminals	
AZ200SK-T1P2P	Door detection sensor, diagnostic output, 2 PNP safety outputs
AZ200SK-TSD2P	Door detection sensor, serial diagnostic output*, 2 PNP safety outputs
M23 x1 quick connect, 8+1 pin	
AZ200ST1-T1P2P	Door detection sensor, diagnostic output, 2 PNP safety outputs
AZ200ST1-TSD2P	Door detection sensor, serial diagnostic output*, 2 PNP safety outputs
M12x1 quick connect, 8 pin	
AZ200ST2-T1P2P	Door detection sensor, diagnostic output, 2 PNP safety outputs
AZ200ST2-TSD2P	Door detection sensor, serial diagnostic output*, 2 PNP safety outputs

* Sensors with Serial Diagnostic output are for use with various field bus protocols, see page 204 for SD Gateways.

ACTUATORS

Part Number	Description
AZ/AZM200-B1-LT	Sliding Guard Actuator, approach from left
AZ/AZM200-B1-LTP0	Sliding Guard Actuator, approach from left with inside emergency door release
AZ/AZM200-B1-RT	Sliding Guard Actuator, approach from right
AZ/AZM200-B1-RTP0	Sliding Guard Actuator, approach from right with inside emergency door release
AZ/AZM200-B30-LTAG1	Door Handle Actuator, hinged on left
AZ/AZM200-B30-LTAG1P1	Door Handle Actuator, hinged on left with inside emergency door release
AZ/AZM200-B30-RTAG1	Door Handle Actuator, hinged on right
AZ/AZM200-B30-RTAG1P1	Door Handle Actuator, hinged on right with inside emergency door release

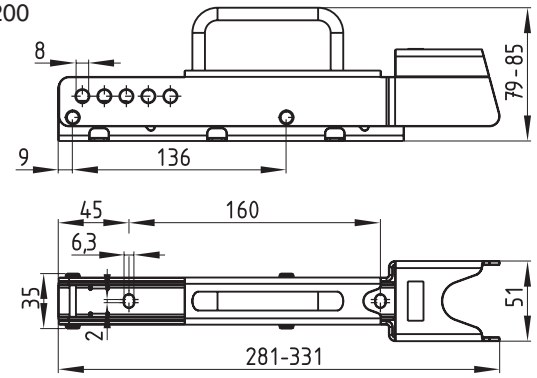
Note: For appropriate connector cable for ST models, please see page 94.

For ST1 models, order cable starting with A-K8+1-M23...

For ST2 models, order cable staring with A-K8P-M12...

Part number: SZ200

Description:
Lockout tag,
up to 5 padlocks



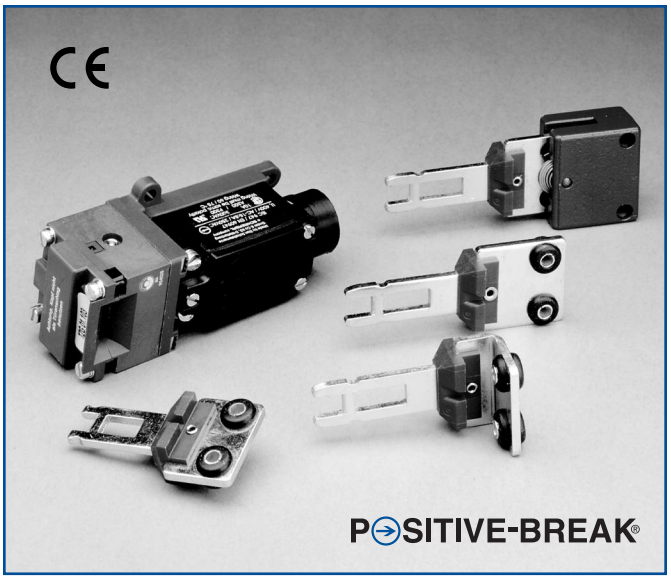
Safety Control Module Requirements
Dual-channel safety inputs, suitable for PNP semiconductor outputs. See page 320 for recommended SCHMERSAL safety control modules.

*Note: A safety control module may be required for reset function and/or feedback monitoring functions, as well as increased output current requirements.

NOTE: For complete technical data, diagnostics and wiring examples, please see page 166 of the "Pulse-Echo Based Non-Contact Safety Sensors" section.

SERIES TZG

Movable Machine Guard Safety Interlock Switch



Description

The Series TZG is designed for use with movable machine guards/access gates which must be closed for operator safety. Their positive-opening NC contacts provide a significantly higher level of safety than conventional spring-driven switches whose contacts can weld or stick shut. And their tamper-resistant design prevents bypassing with simple tools, bent wires or other readily available means. Their IP67 rating makes them ideal for interlocking safety guards in hostile environments.

Operation

The Series TZG electromechanical safety interlock switch consists of a rugged switch mechanism and a geometrically-unique actuating key. The key is mounted to the movable guard. Upon opening of the guard the NC contact(s) are forced to open through a direct (non-resilient) mechanical linkage with the actuating key. These positive-break NC contacts assure circuit interruption (and machine stoppage) upon removal of the actuator key. (The NO contact closes upon key removal.)

When the guard is closed, the actuating key forces the NC contacts to close and the NO contact to re-open.

Typical Applications

The Series TZG is intended for use as a safety interlock switch on movable machine guards which, when open, expose the operator/maintenance personnel to machine hazards. Typical applications are the interlocking of protective gratings, access doors/gates, hinged covers, access panels and other movable guards.

Features & Benefits

- **Highly tamper-resistant actuating mechanism** … difficult to defeat with simple tools, tape, bent wires, etc. Reduces liability exposure.
- **Four optional key entry locations** … rotatable actuator head provides installation versatility.
- **"Positive-Break" NC contacts** … assure circuit interruption upon actuator key removal.
- **High key retention force (5 pounds)** … eliminates inadvertent opening of guard due to shock/vibration.
- **Watertight design** … meets IP67 washdown requirements.
- **High-strength, galvanized-steel actuator key** … tolerates mechanical abuse without damage.
- **Rugged, corrosion-resistant housing** … tolerates the most hostile environments.
- **Wide selection of actuating keys** … to meet diverse application requirements.
- **Padlockable key** … for added security during equipment maintenance.
- **Designed to meet Performance Level requirements of EN ISO 13849-1 and Safety Control Categories of EN 954-1.**
- **Funnel-shaped key entry** … forgiving of key misalignment.

AVAILABLE STANDARD MODELS

(Includes ½" NPT Plastic Conduit Adapter. Actuator Keys Sold Separately)

Part Number	Contacts	Description*
TZG01.103	1 NO & 1 NC	Keyed interlock switch with front* key entry and slow action contacts.
TZG01.110	2 NC	

*Field-rotatable actuator head for key entry from right, left or rear.

OPTIONAL ACTUATOR KEYS

Part Number	Description
TZ/CO	Standard straight actuator key (13" minimum closing radius)
TZ/CW	Right-angled straight actuator key (11.8" minimum closing radius)
TZ/COR	Radial entry actuator key (11.8" minimum closing radius)
TZ/CK	Short straight actuator key (6.3" minimum closing radius)
TZ/CWR	Right-angled bent actuator key (11.8" minimum closing radius)
TZ/COF/HIS.1	Pivoting straight actuator key (rear-mounted) (13.8" minimum closing radius)
TZ/COF/HIS.2	Pivoting straight actuator key (top-mounted) (13.8" minimum closing radius)
TZ/CORF/HIS.1	Pivoting straight actuator key (rear-mounted) (7.1" minimum closing radius)
TZ/CORF/HIS.2	Pivoting straight actuator key (top-mounted) (5.9" minimum closing radius)

TZG TECHNICAL DATA

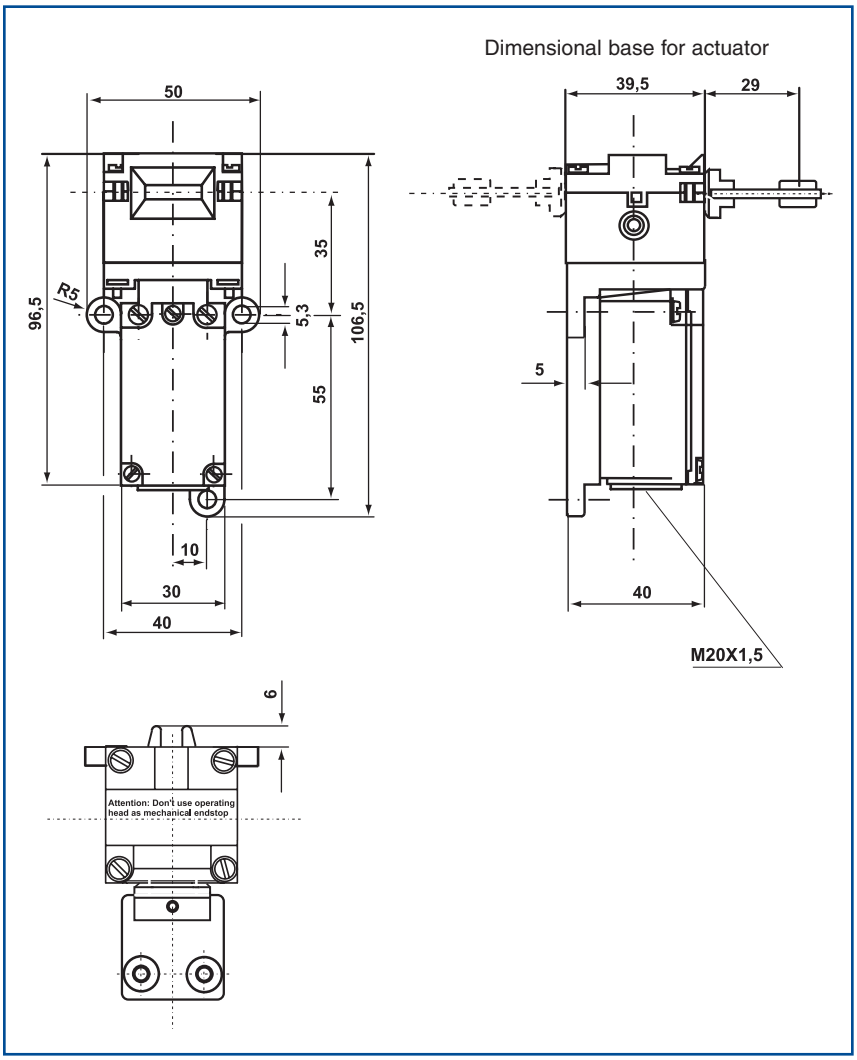
MECHANICAL SPECIFICATIONS

Housing	Glass-fibre reinforced self-extinguishing thermoplastic
Actuator Key	Galvanized steel (defeat-resistant design)
Degree of Protection	IP67
Holding Force	20N (4.8 pounds)
Travel for Positive-Break	12.5mm
Force to Reach Positive-Break	Approx. 20N (4.8 pounds)
Closing Force	Approx. 10 N (2.4 pounds)
Operating Temperature	–13°F to +158°F
Mechanical Life	1 million operations (minimum)
Shock Resistance	>30g / 18ms
Vibration Resistance	>15g / 10…200Hz
Conformity to Standards	IEC 947-5-1 CE EN 60947-5-1 BG-GS-ET-15 EN ISO 13849-1 UL EN 954-1 CSA
Minimum Closing Radius	Dependent upon actuator key used. Please see actuator key selection chart.

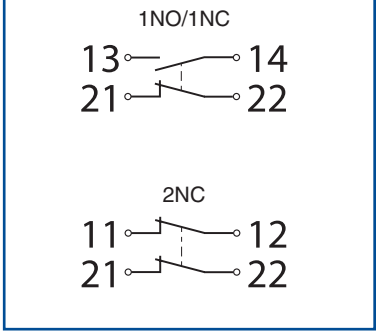
ELECTRICAL SPECIFICATIONS

Contacts	Fine silver
Contact Configuration	Double-pole, double-break with electrically separated contact bridges
Contact Gap	2 × 3.5 mm
Contact Rating	8A (250VAC)
Switching Action	Slow-action, positive-break NC contacts (TZG models) Snap-action, positive-break NC contacts (TZGP models)
Short Circuit Protection	10A (slow-blow) – TZG models 6A (slow-blow) – TZGP models
Rated Insulation Voltage	250VAC
Rated Impulse Withstand Voltage	4kV
Type Terminals	Screw terminals with self-lifting clamps for up to 13 AWG solid wire (2.5mm²) or 13 AWG stranded (1.5mm²) wire

DIMENSIONS



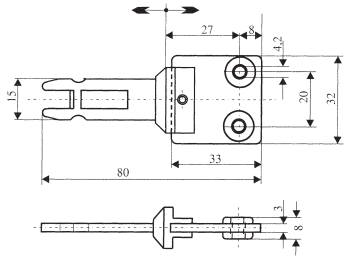
CONTACT CONFIGURATIONS



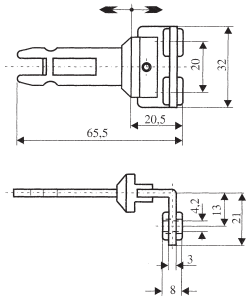
SERIES TZG ACTUATORS

ACTUATOR KEYS

TZ/CO



TZ/CW



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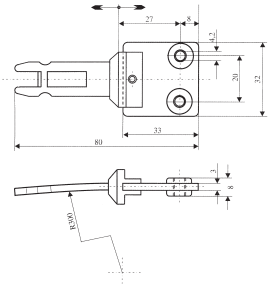
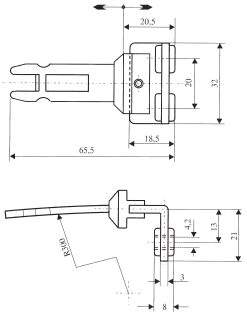


TZ/CWR



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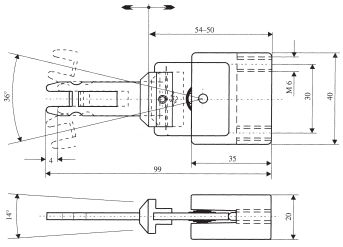

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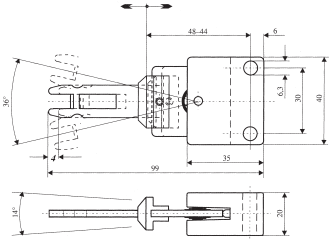

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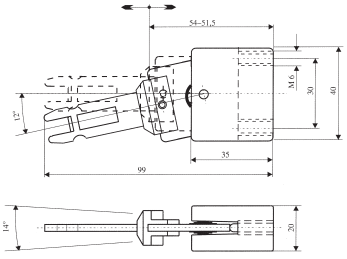

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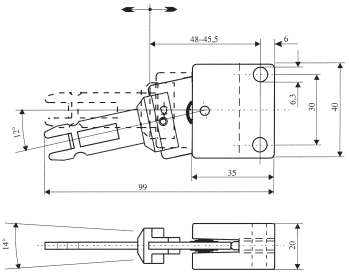
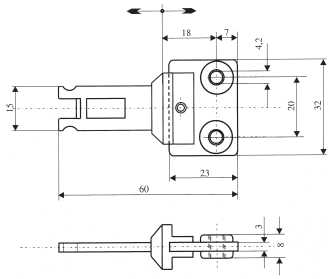


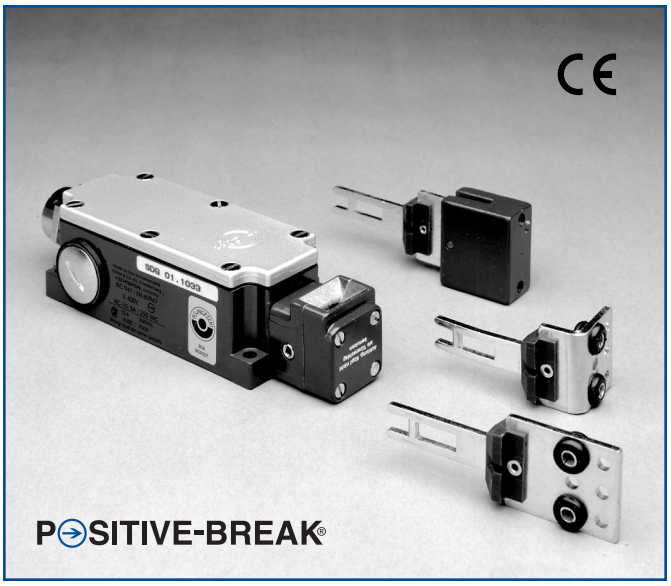
TZ/CK



Safer
by
Design

SERIES SDG

Movable Machine Guard Safety Interlock Switch



Description

The Series SDG is designed for use with movable machine guards/access gates which must be closed for operator safety. Their positive-opening NC contacts provide a significantly higher level of safety than conventional spring-driven switches whose contacts can weld or stick shut. And their tamper-resistant design prevents bypassing with simple tools, bent wires or other readily available means. Their IP67 rating makes them ideal for interlocking safety guards in hostile environments.

Operation

The Series SDG electromechanical safety interlock switch consists of a rugged switch mechanism and a geometrically-unique actuating key. The key is mounted to the movable guard. Upon opening of the guard the NC contact(s) are forced to open through a direct (non-resilient) mechanical linkage with the actuating key. These positive-break NC contacts assure circuit interruption (and machine stoppage) upon removal of the actuator key. (The NO contact closes upon key removal.)

When the guard is closed, the actuating key forces the NC contacts to close and the NO contact to re-open.

Typical Applications

The Series SDG is intended for use as a safety interlock switch on movable machine guards which, when open, expose the operator/maintenance personnel to machine hazards. Typical applications are the interlocking of protective gratings, access doors/gates, hinged covers, access panels and other movable guards.

Features & Benefits

- **Highly tamper-resistant actuating mechanism** … difficult to defeat with simple tools, tape, bent wires, etc. Reduces liability exposure.
- **Four optional key entry locations** … rotatable actuator head provides installation versatility.
- **"Positive-Break" NC contacts** … assure circuit interruption upon actuator key removal.
- **Built-in retention force (1.2 pounds)** … eliminates inadvertent opening of guard due to shock/vibration.
- **Watertight design** … meets IP67 washdown requirements.
- **High-strength steel actuator key** … tolerates mechanical abuse without damage.
- **Rugged, corrosion-resistant metal housing** … tolerates the most hostile environments.
- **Wide selection of actuating keys** … to meet diverse application requirements.
- **Designed to meet Performance Level requirements of EN ISO 13849-1 and Safety Control Categories of EN 954-1.**
- **Funnel-shaped key entry** … forgiving of key misalignment.
- **Other 2-contact configurations available** … please consult factory.

AVAILABLE STANDARD MODELS
(Includes ½" NPT Conduit Adapter. Actuator Keys Sold Separately)

Part Number	Contacts	Description*
SDG01.1044	2 NO & 1 NC	Keyed interlock switch with front* key entry and slow action contacts.
SDG01.1103	1 NO & 2 NC	
SDG01.1110	3 NC	

*Field-rotatable for key entry from right, left or rear. Units are supplied with tamper-resistant (one-way) screws to replace the standard screws after rotating the actuator head for desired direction of key entry.

AVAILABLE ACTUATOR KEYS

Part Number	Description
BO	Standard straight actuator key (20" minimum closing radius)
BOW	Right-angled straight actuator key (20" minimum closing radius)
BOR	Radial entry actuator key (10" minimum closing radius)
BOWR	Right-angled bent actuator key (10" minimum closing radius)
BOF/HIS.1	Pivoting straight actuator key (rear-mounted) (13.8" Minimum closing radius)
BOF/HIS.2	Pivoting straight actuator key (top-mounted) (13.8" Minimum closing radius)

SDG AVAILABLE MODELS AND ACCESSORIES

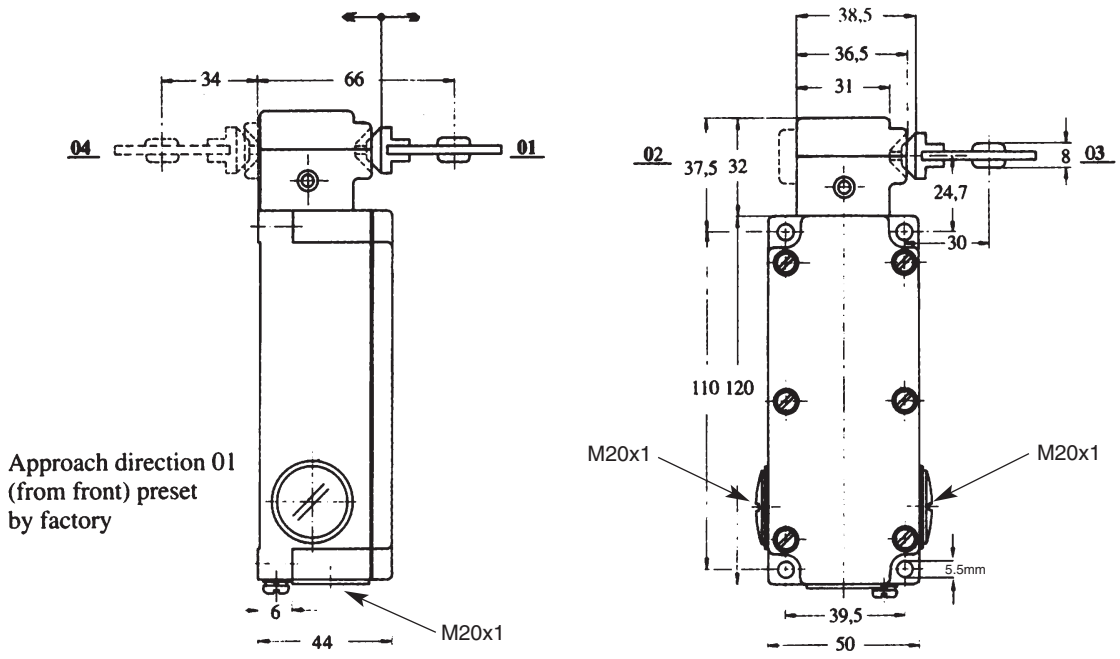
MECHANICAL SPECIFICATIONS

Housing	Cast aluminum with enamel paint
Actuator Key	Steel (chromated) (defeat-resistant design)
Degree of Protection	IP67 (Switch housing) IP00 (Reversing and locking head)
Holding Force	5N (1.2 pounds)
Travel for Positive-Break	12.5mm
Force to Reach Positive-Break	Approx. 5N (1.2 pounds)
Closing Force	Approx. 5N (1.2 pounds)
Operating Temperature	–13°F to +158°F
Mechanical Life	1 million operations (minimum)
Shock Resistance	>30g / 18ms
Vibration Resistance	>15g / 10…200Hz
Conformity to Standards	IEC 947-5-1 CE EN 60947-5-1 BG-GS-ET-15 EN ISO 13849-1 UL EN 954-1 CSA
Minimum Closing Radius	Dependent upon actuator key used. Please see actuator key selection chart.

ELECTRICAL SPECIFICATIONS

Contacts	Fine silver
Contact Configuration	Double-pole, double-break with electrically separated contact bridges
Contact Gap	2 × 3.5 mm
Contact Rating	8A (250VAC)
Switching Action	Slow-action, positive-break NC contacts
Short Circuit Protection	10A (slow-blow)
Rated Insulation Voltage	250VAC
Rated Impulse Withstand Voltage	4kV
Type Terminals	Screw terminals with self-lifting clamps for up to 13 AWG solid wire (2.5mm²) or 13 AWG stranded (1.5mm²) wire

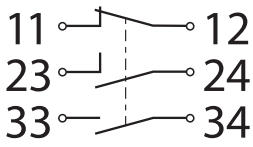
DIMENSIONS



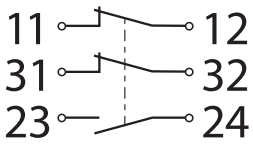
SDG TECHNICAL DATA

CONTACT CONFIGURATIONS

SDG01.1044



SDG01.1103



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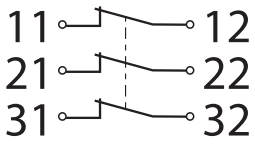
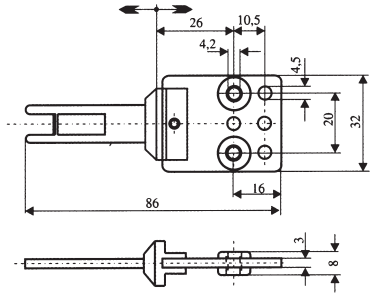
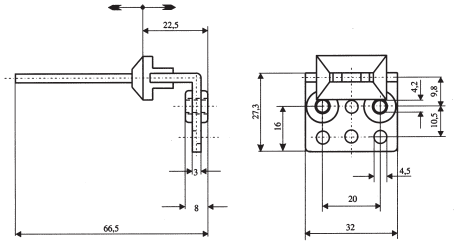


ACTUATOR KEYS

BO



BOW



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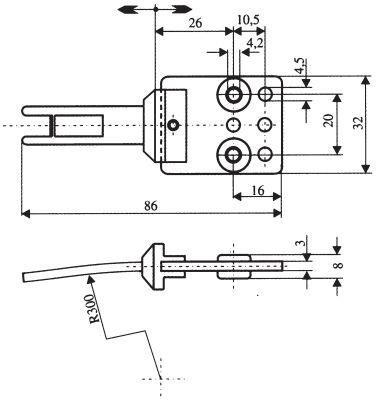

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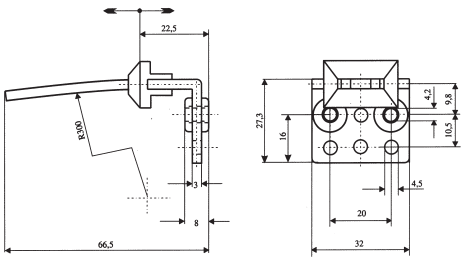

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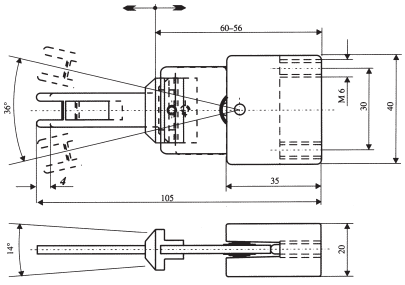
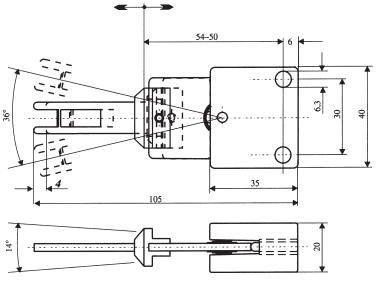


BOF/HIS.2



Safer
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SERIES AZ3350

Tamper-Resistant Movable Machine Guard Safety Interlock Switch

P⊖SITIVE-BREAK®

Description

The AZ3350 Series is designed for use with movable machine guards/access gates which must be closed for operator safety. Their positive-opening NC contacts provide a significantly higher level of safety than conventional spring-driven switches whose contacts can weld or stick shut. And the switch's tamper-resistant design prevents bypassing with simple tools, bent wires or other readily available means. Their rugged metal housing and IP67 rating make them ideal for interlocking safety guards in industrial and hostile environments.

Operation

The AZ3350 electromechanical safety interlock switch consists of a rugged switch mechanism and a geometrically-unique actuating key. The key is mounted to the movable guard. Upon opening of the guard, the NC contact(s) are forced to open through a direct (non-resilient) mechanical linkage with the actuating key. These positive-break NC contacts assure circuit interruption (and machine stoppage) upon removal of the actuator key. (The NO contacts close upon key removal.)

When the guard is closed, the actuating key forces the NC contact(s) to close, and the NO contacts to re-open.

Typical Applications

The AZ3350 is intended for use as a safety interlock switch on movable machine guards which, when open, expose the operator/maintenance personnel to machine hazards. Typical applications are the interlocking of protective gratings, access doors/panels, perimeter access gates, hinged covers and other movable guards on textile machinery, packaging equipment, machine tools, assembly machinery, robot work cells and food/chemical processing equipment.

Features & Benefits

- **Rugged, corrosion-resistant die-cast aluminum housing** … tolerates the most hostile environments.
- **"Positive-break" NC contacts** … assure circuit interruption upon actuator key removal.
- **Highly tamper-resistant** … difficult to defeat with simple tools, tape, bent wires, etc. Reduces liability exposure.
- **Watertight design** … meets IP67 washdown requirements.
- **Four optional key entry locations** … depending upon orientation of rotatable actuator head.
- **High-strength actuator key** … tolerant to mechanical abuse without damage.
- **Funnel shaped key entry** … forgiving of key misalignment.
- **Designed to meet Performance Level requirements of EN ISO 13849-1 and Safety Control Categories of EN 954-1.**
- **Wide selection of actuator keys** … to meet diverse application requirements.
- **Optional M12x1 quick-connect** … please consult factory.

AVAILABLE STANDARD MODELS

(Includes ½" NPT Adapter. Actuator keys sold separately)

Part Number	Contacts (with key inserted)
AZ3350-12ZUEK	1 NO & 2 NC
AZ3350-03ZK	3 NC

Please note: Standard models have the actuator head facing forward. See page 78 for units with the actuator head rotated to the left (U90) or right (U270) for use with STS door handles.

ACTUATOR KEYS

Part Number	Description
AZ3350-B1	Straight actuator key
AZ3350-B1R	Bent radius actuating key
AZ3350-B5	Straight actuator key, right angle mounting
AZ3350-B5R	Bent radius actuating key, right angle mounting
AZ3350-B6	Pivoting straight actuator key, rear mounting
AZ3350-B6H	Pivoting straight actuator key, top mounting
AZ3350-STS30-01	STS Door Handle kits for use with AZ3350 switches. (See page 77 for details.)
AZ3350-STS30-02	
AZ3350-STS30-03	
AZ3350-STS30-04	
AZ3350-STS30-05	
AZ3350-STS30-06	
AZ3350-STS30-07	
AZ3350-STS30-08	

AZ3350 TECHNICAL DATA

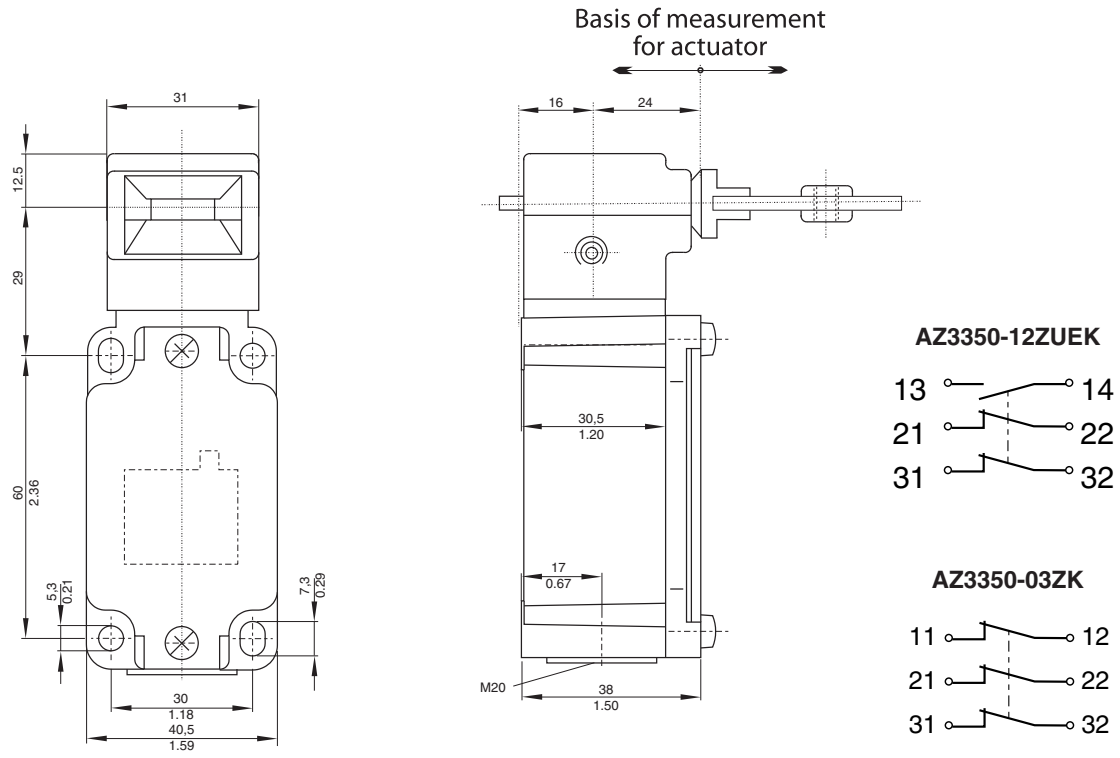
MECHANICAL SPECIFICATIONS

Housing	Diecast light alloy with baked enamel finish
Actuator Key	Chromated steel (defeat-resistant design)
Degree of Protection	IP67
Travel for Positive-Break	10.7 mm (0.4 inches)
Closing Force	Approx. 15 N (3.4 pounds)
Operating Temperature	–30°C to +90°C
Mechanical Life	> 10^7 operations
Key Holding Force	30 N (7 pounds) (“R” models only)
Conformity to Standards	EN ISO 13849-1 BG-GS-ET-15 EN 60947-5-1 UL EN 954-1 CSA CE
Minimum Closing Radius	B1 & B5 keys: 150mm B6, B5-Flex & B6-Flex keys: 100mm
Actuating Speed	Max 0.2 m/s
Actuating Frequency	Max 1200 operations per hour

ELECTRICAL SPECIFICATIONS

Contacts	Fine silver
Contact Configuration	Type Zb double-break contact or 3 NC contacts with galvanically separated contact bridges.
Contact Gap	2 × 1.25mm (minimum)
Contact Rating	4A (230VAC) 4A (24VDC)
Switching Action	Slow-action, positive-break NC contacts
Short Circuit Protection	Fuse 6A (time-delay)
Rated Insulation Voltage	250VAC
Rated Impulse Withstand Voltage	4kV
Type Terminals	Screw terminals (min 0.75mm², max 2.5mm² – including conductor ferrules)

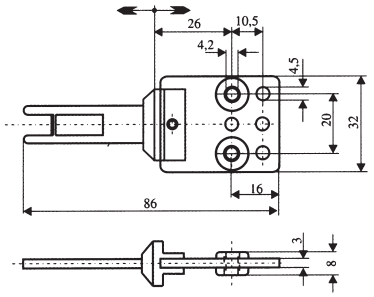
DIMENSIONS & CONTACT SCHEMATICS



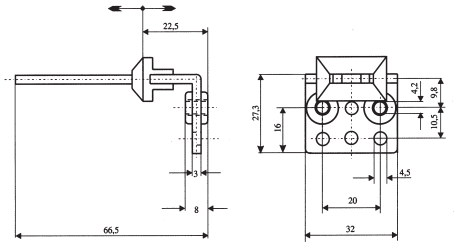
AZ3350 ACTUATOR KEY SPECIFICATIONS

ACTUATOR KEYS

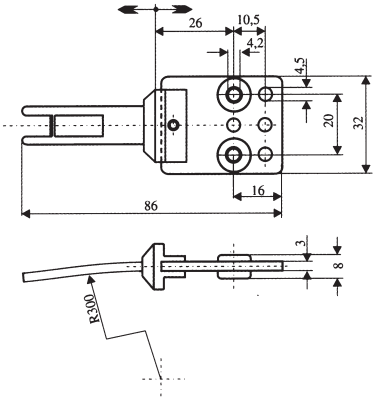
AZ3350-B1



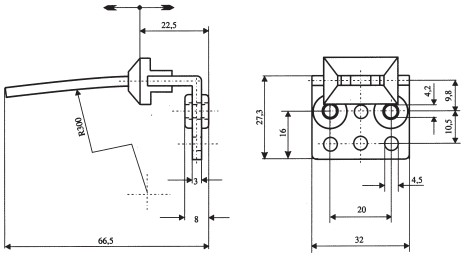
AZ3350-B5



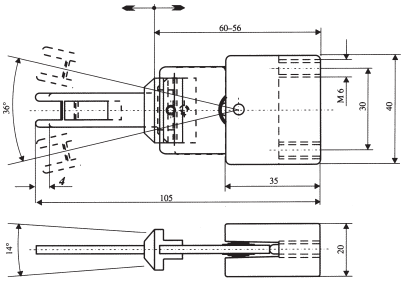
AZ3350-B1R



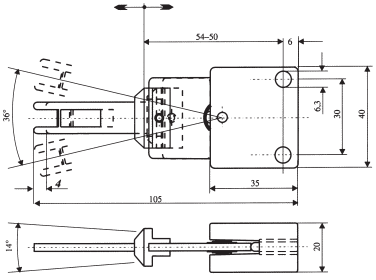
AZ3350-B5R



AZ3350-B6



AZ3350-B6H



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SERIES SHGV

Cable-less Keyed Mechanical Safety Guard Interlock with Key Transfer System

Description

The SHGV Series consist of a guard-mounted mechanical locking device and a 2-position key operated selector switch for control panel mounting. This unique key transfer system assures the removal of power before allowing the access control guard to be open … without the need for electrical wiring at the interlocked machine guard location.

Operation

When the machine guard is open the transfer key (for operating the 2-position selector switch) cannot be withdrawn from the guard locking mechanism.

Upon closing of the guard, the mechanical actuator key permits the transfer-key to be turned (locking the guard) and withdrawn. The transfer-key can now be removed and inserted into the 2-position selector switch, allowing it to be operated (e.g. power to be turned on) … trapping the transfer key in the "on" position.

To unlock (open) the guard, the selector switch must be turned to the off position. The transfer-key can now be withdrawn and inserted into the guard-locking mechanism for release of the mechanical actuator key and opening of the guard.

The two lock barrel version allows the removal of a second transfer key when the mechanical actuator key has been released. This second transfer key prevents the removal of the "power control" transfer key from the keyed interlock. Thus it can be removed from the interlock by the operator to protect against the inadvertent start-up of the equipment.

Typical Applications

Recommended for use where wiring directly to the movable guard is cost prohibitive or subject to damage due corrosive chemicals or other harsh environmental conditions.

Features & Benefits

- **Highly tamper resistant …** difficult to defeat with simple tools, thereby reducing liability exposure.
- **Four optional key entry positions …** provides installation versatility.
- **Three optional locking cylinder locations …** provides installation versatility.
- **Corrosion resistant …** tolerates hostile environments.
- **Funnel shaped entry …** forgiving of mechanical actuator key misalignment
- **Low cost guard locking …** eliminates wiring at the guard.
- **Designed to meet Performance Level requirements of EN ISO 13849-1 and Safety Control Categories of EN 954-1.**

AVAILABLE MODELS

Part Number	Description
SHGV/L1 (*) ESS21S2/103	Lock Barrel Left
SHGV/R1 (*) ESS21S2/103	Lock Barrel Right
SHGV/B1 (*) ESS21S2/103	Lock Barrel Rear
SHGV/LD1 (*) / (*) ESS21S2/103	Lock Barrel Left & Lock Barrel in Front Cover
SHGV/RD1 (*) / (*) ESS21S2/103	Lock Barrel Right & Lock Barrel in Front Cover

Includes guard device SHGV with standard BO actuator element, keyed selector switch ESS21S2, and contact block EF103 (1NO/1NC)

(*) Individual key identification code stamped on selector switch cylinder.

Note:

This system is recommended for applications in which there is no residual motion or hazard after the removal of power. For applications in which there is residual motion or the presence of a hazard immediately following the removal of power, a solenoid-locking console (Model SVE) is recommended. Please consult factory.

SERIES SHGV TECHNICAL DATA

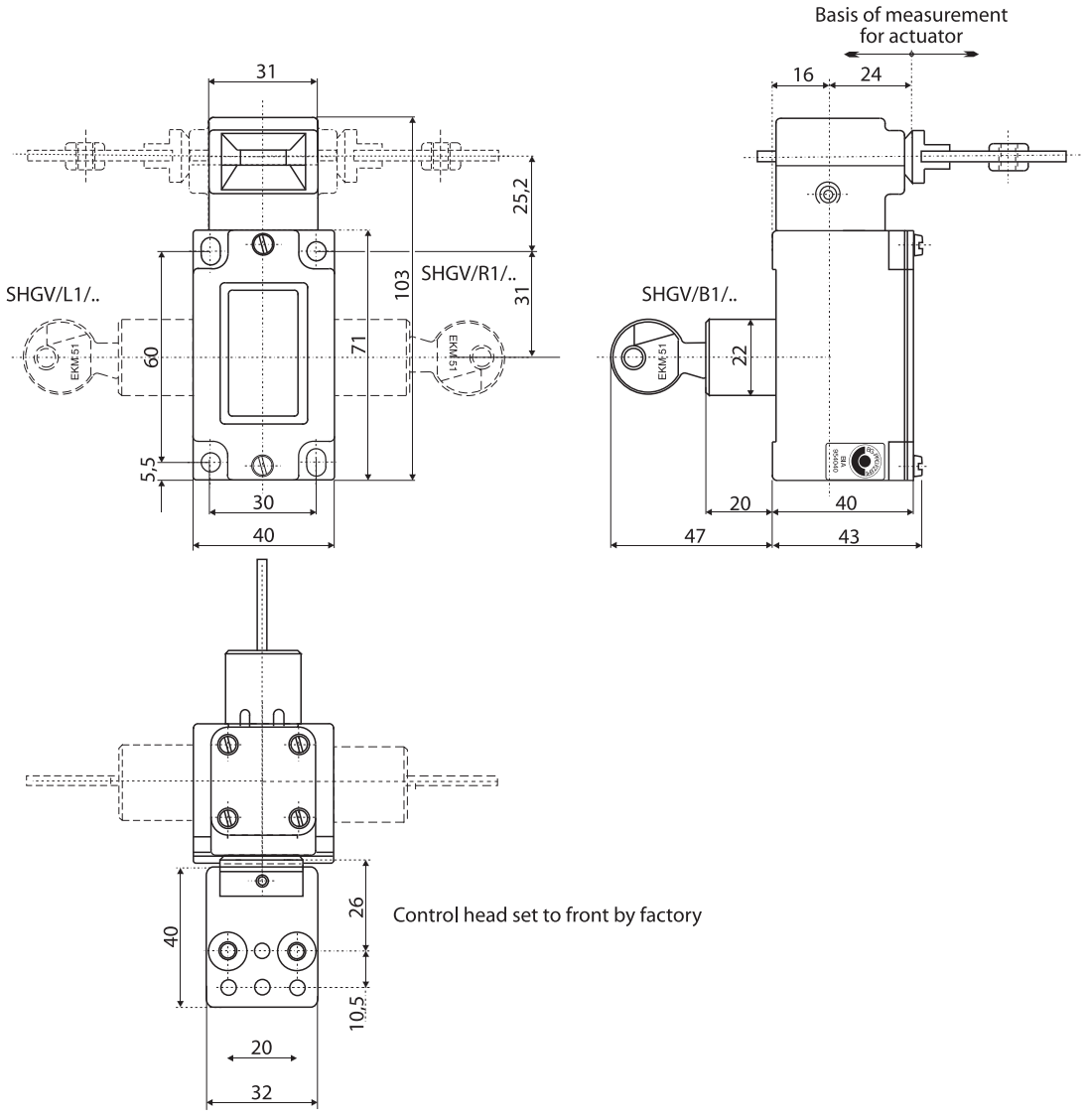
MECHANICAL SPECIFICATIONS

Protection Class	IP 65 (Housing) IEC/EN 60529 IP 00 (Control Head) IEC/EN 60529
Actuating Forces	Insertion of actuating element - 15 N Withdrawal of actuating element - 5 N
Ambient temperature	- 25 °C to + 70 °C
Storage temperature	- 40 °C to + 80 °C
Material **Housing** **SHG Cover**	ALsi 12 painted signal red (RAL 3000) Steel passivated with Perbunan seals(oil and gasoline resistant)
Mechanical life	2 x 10^6 operating cycles
Shock resistance	> 30 x g / 18ms
Vibration resistance	> 15 x g/10 ... 200 Hz
Climatic resistance	40/91 to DIN 50015 FW 24 to DIN 50016
Conformity to Standards	EN ISO 13849-1 CSA EN 954-1 EN ISO 13850 CE IEC 60947-5-1 UL

ELECTRICAL SPECIFICATIONS

Conformity to Standard	IEC/EN 60947-5-1
Protection Class	IP 65 to IEC/EN 60529
Contacts	Fine silver
Rated breaking capacity	230Vac/6A - 400VAC/4A
Rated operating current	230Vac/6A - 400VAC/4A
Rated insulation voltage	400VAC / 450VDC
Thermal test current	10 A
Utilization Category	AC-15; DC-13
Max. fuse rating	10 A (slow blow)
Ambient temperature	- 25 °C to + 80 °C
Switching frequency	6000 s/h

DIMENSIONAL DRAWING FOR SHGV GUARD LOCKING DEVICE



SERIES AZ415

Tamper-Resistant Movable Machine Guard Safety Interlock Switch

P⊖SITIVE-BREAK®

CE

Description

The AZ415 Series is designed for movable machine guards/access gates which must be closed for operator safety. Their positive-opening NC contacts provide a significantly higher level of safety than conventional spring-driven switches whose contacts can weld or stick shut. And their tamper-resistant design prevents bypassing with simple tools, bent wires or other readily available means.

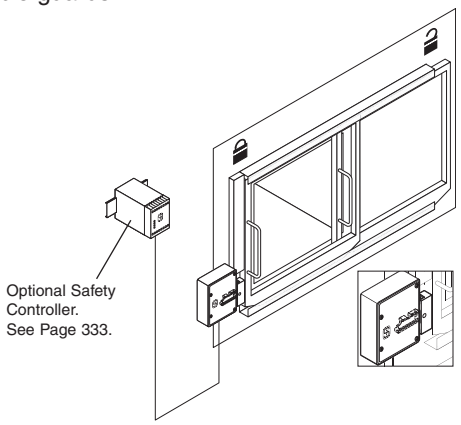
Operation

The AZ415 electromechanical safety interlock switch consists of a rugged switch mechanism and a geometrically-unique actuating key. The key is mounted to the movable guard. Upon opening of the guard, the NC contacts are forced to open through a direct (non-resilient) mechanical linkage with the actuating key. These NC contacts assure circuit interruption (and machine stoppage) upon removal of the actuator key. (The NO contacts close upon key removal.)

In the closed position, the guard is held shut by an adjustable ball catch integral to the AZ415 housing.

Typical Applications

The AZ415 is intended for use as a safety interlock switch on movable machine guards which, when open, expose the operator/maintenance personnel to machine hazards. Typical applications are the interlocking of protective gratings, access doors/gates, hinged covers, access panels and other movable guards.



Features & Benefits

- **Highly tamper-resistant** … difficult to defeat.
- **"Positive-break" NC contacts** … assure circuit interruption upon key removal.
- **Watertight design** … meets IP67 washdown requirements.
- **High-strength, metal actuator key** … tolerates mechanical abuse without damage.
- **Rugged, enamel-coated metal housing** … tolerates the most hostile environments.
- **Adjustable actuator key holding force up to 110 pounds** … permits use of switch as door latch.
- **Designed to meet Performance Level requirements of EN ISO 13849-1 and Safety Control Categories of EN 954-1.**

AVAILABLE STANDARD MODELS
(Actuator key sold separately … see below)

Part Number (AZ415 - Switch Block S1*/ Switch Block S2)	Contact Configuration with actuator key inserted (Switch Block S1*/Switch Block S2)
AZ415-11/11ZPK	1 NO & 1 NC / 1 NO & 1 NC
AZ415-02/20ZPK	2 NC / 2 NO
AZ415-02/11ZPK	2 NC / 1 NO & 1 NC
AZ415-02/02ZPK	2 NC / 2 NC

*Only Switch Block S1 has positive-break contacts.

ACTUATING KEYS & ACCESSORIES

Part Number	Description
AZ/AZM415-B1	Linear entry actuator key
AZ/AZM415-B2	Small radius x-axis entry actuator key (9.8" minimum closing radius)
AZ/AZM415-B3	Small radius y-radius entry actuator key (9.8" minimum closing radius)
AZ/AZM415-B4PS	Slide bolt actuator key
AZ415-STS30-01	STS Door Handle kits for use with AZ415 switches. See page 77 for details.
AZ415-STS30-02	
AZ415-STS30-03	
AZ415-STS30-04	
AZ415-STS30-05	
AZ415-STS30-06	
AZ415-STS30-07	
AZ415-STS30-08	
MP-AZ415-22	Mounting plate
SZ415-22-1	Lockout device for switch
SZ415-22-2	Lockout device for switch
SZ415-1	Lockout device for STS door handles
SZ415-2	Lockout device for STS door handles

AZ415 TECHNICAL DATA

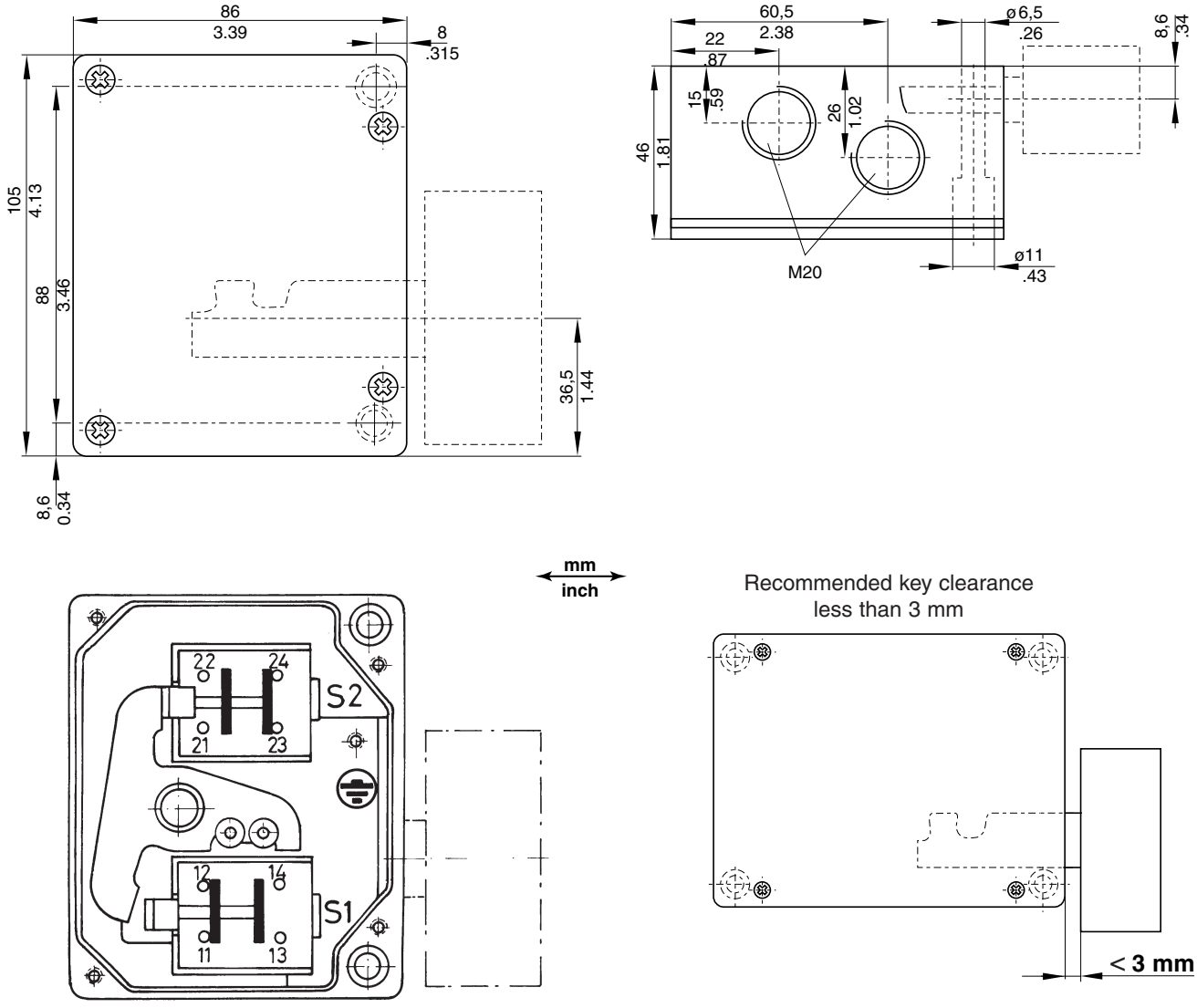
MECHANICAL SPECIFICATIONS

Housing	Die-cast aluminum with blue enamel finish
Actuator Key	key shaft: Zinc coated brass mounting block: Zinc coated steel
Degree of Protection	IP67
Travel for Positive-Break	0.2 inches (5mm)
Force to Reach Positive-Break	Depending upon ball catch setting (3.5 pounds minimum)
Actuator Key Holding Force	Adjustable, 80 to 400 N
Operating Temperature	-13°F to +175°F
Mechanical Life	1 million operations
Conformity to Standards	IEC 947-5-1 CE BG-GS-ET-19 UL EN ISO 13849-1 CSA EN 954-1
Minimum Closing Radius	9.8" (250 mm) with B2 or B3 actuating key

ELECTRICAL SPECIFICATIONS

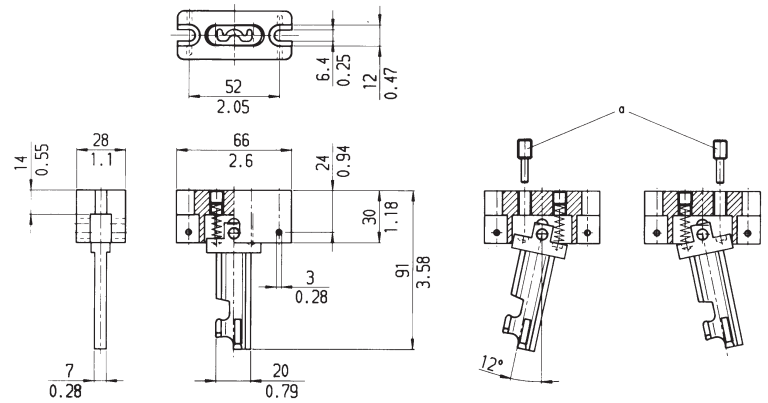
Contacts	Fine silver
Contact Configuration	Double-pole, double-break with electrically separated contact bridges
Contact Gap	2mm x 2mm
Contact Rating	4A (230VAC)
Switching Action	Slow-action, positive-break NC contacts
Short Circuit Protection	Fuse 6A (slow-blow)
Rated Insulation Voltage	250VAC
Rated Impulse Withstand	4kV
Type Terminals	Screw terminals with self-lifting clamps for up to 1.5mm² (15AWG) flexible stranded wire

DIMENSIONS (mm)

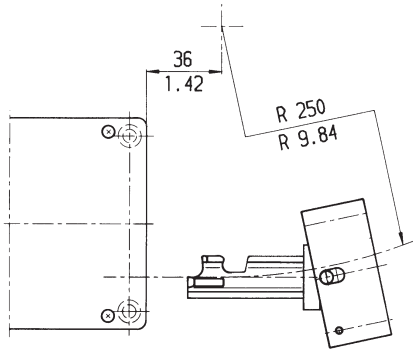


AZ415 TECHNICAL DATA

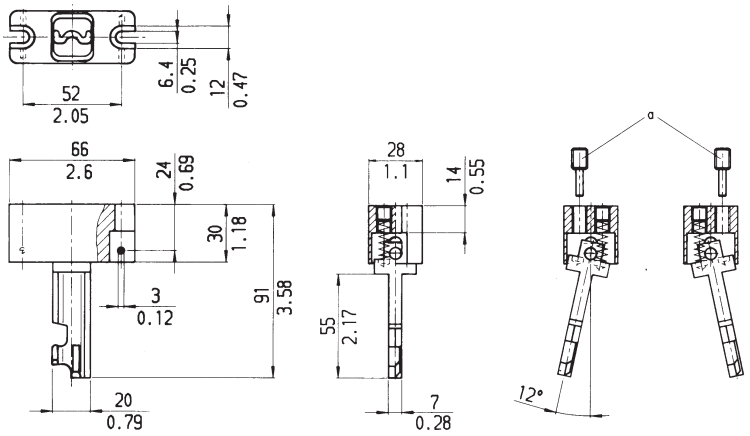
ACTUATOR KEY DIMENSIONS



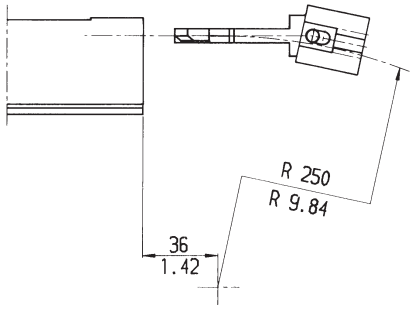
B2 Actuator



B2 Actuating radii
For hinged doors over the wide edge of the actuator



B3 Actuator



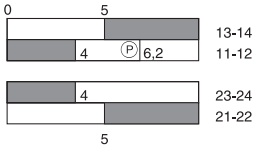
B3 Actuating radii
For hinged doors over the small edge of the actuator

Dowel holes are also provided in the actuator body. With the use of dowel pins the removal of the actuator can be prevented.

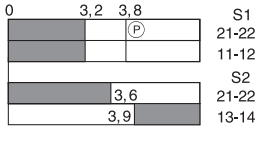
By turning the adjusting screw “a,” the actuator can be brought into any desired position.

Both actuators can also be used on sliding doors.

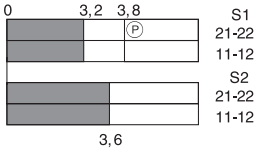
SWITCH TRAVEL AND WIRING DIAGRAMS



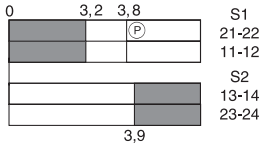
AZ415-11/11



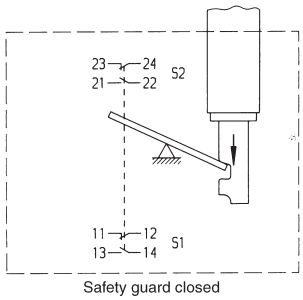
AZ415-02/11



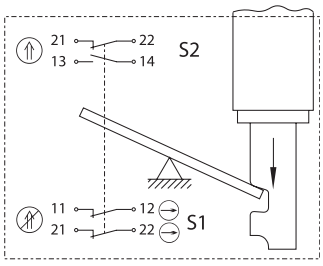
AZ415-02/02

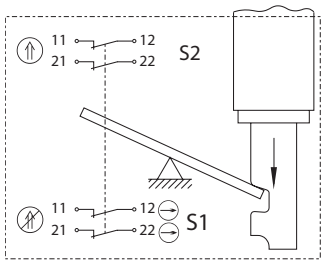


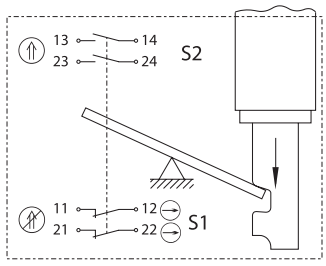
AZ415-02/20



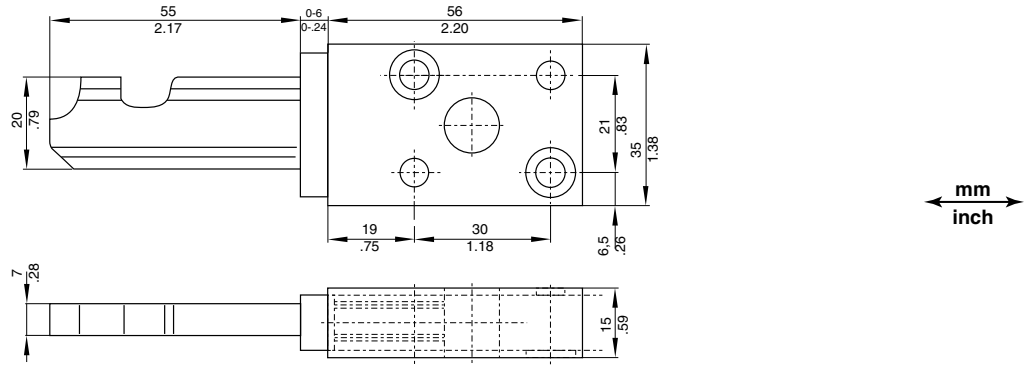
Safety guard closed



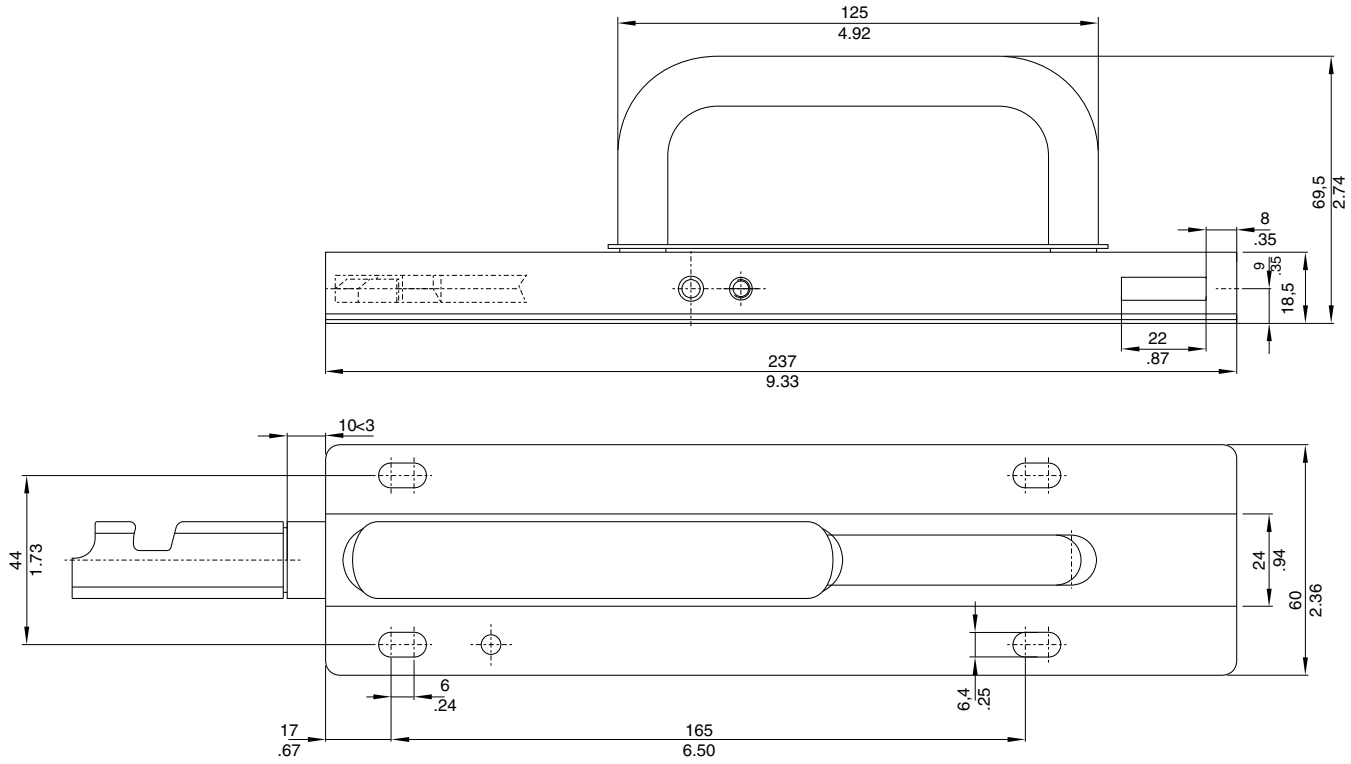




ACTUATOR KEY DIMENSIONS



B1 Actuator



B4pS actuator for hand operated locking

Hand operated locking actuator
The hand operated lock bolt has the following advantages:

1. No further mechanical expenditures such as handles or levers are necessary.
2. The shearing forces on the actuator is 25,000 N (5,500 lbs.).
3. Simple installation of the unit.
4. Observing the actuating radius is not necessary.
5. An open guard door cannot fall shut and lock, causing the switch to be actuated. The door must be manually closed and locked.
6. To insure personal safety when hazardous conditions are present, three holes are provided for padlocking which prevents the door from being locked.

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